

SHEPHERD & CO.'S 10

"UNIVERSAL"

GUIDE TO PHOTOGRAPHY, BY A PRACTICAL PHOTOGRAPHER,

CONTAINING SIMPLE AND PRACTICAL DIRECTIONS FOR PRODUCING
COLLODION PORTRAITS AND VIEWS, POSITIVE AND NEGATIVE,
BOTH ON GLASS AND PAPER;

TOGETHER WITH FULL DIRECTIONS AND PRECISE METHOD

OF

MANIPULATING THE NEWEST AND MOST

APPROVED DRY PROCESSES.

ALSO

A DETAILED METHOD

OF

TAKING STEREOSCOPIC PICTURES.

Illustrated with numerous Woodcuts.

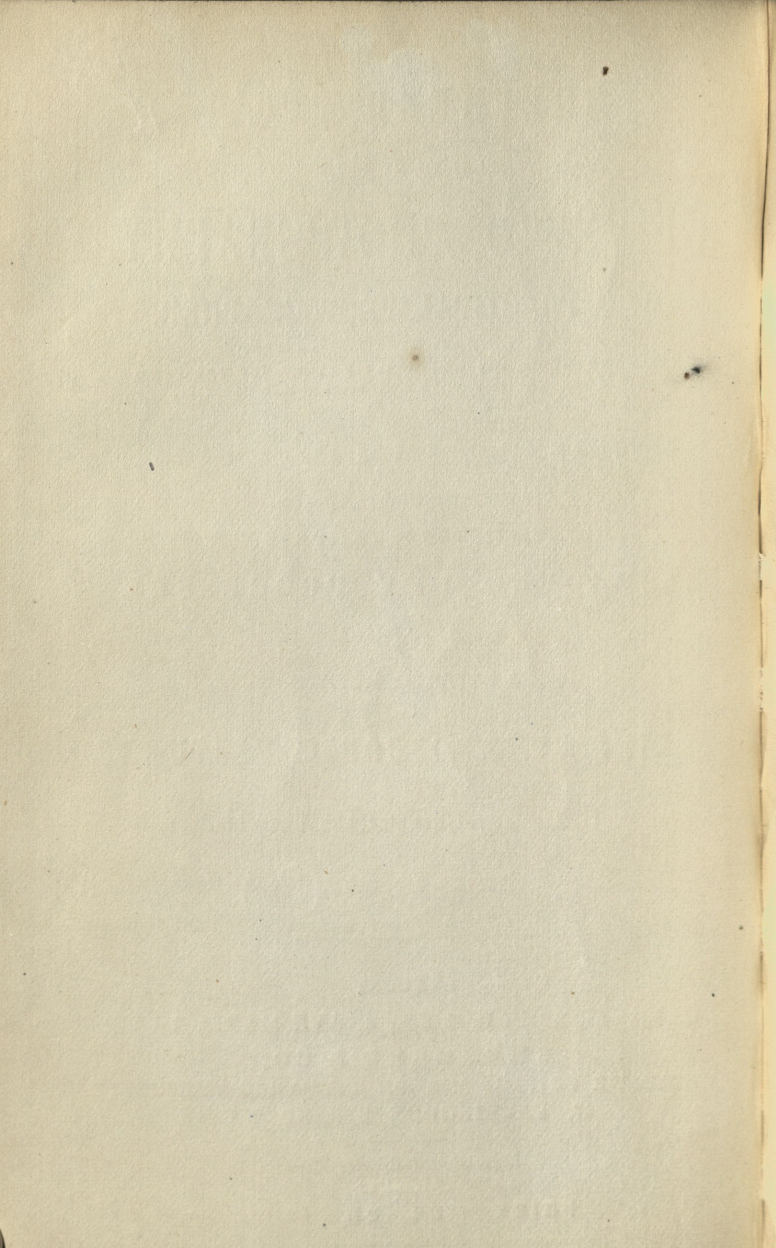
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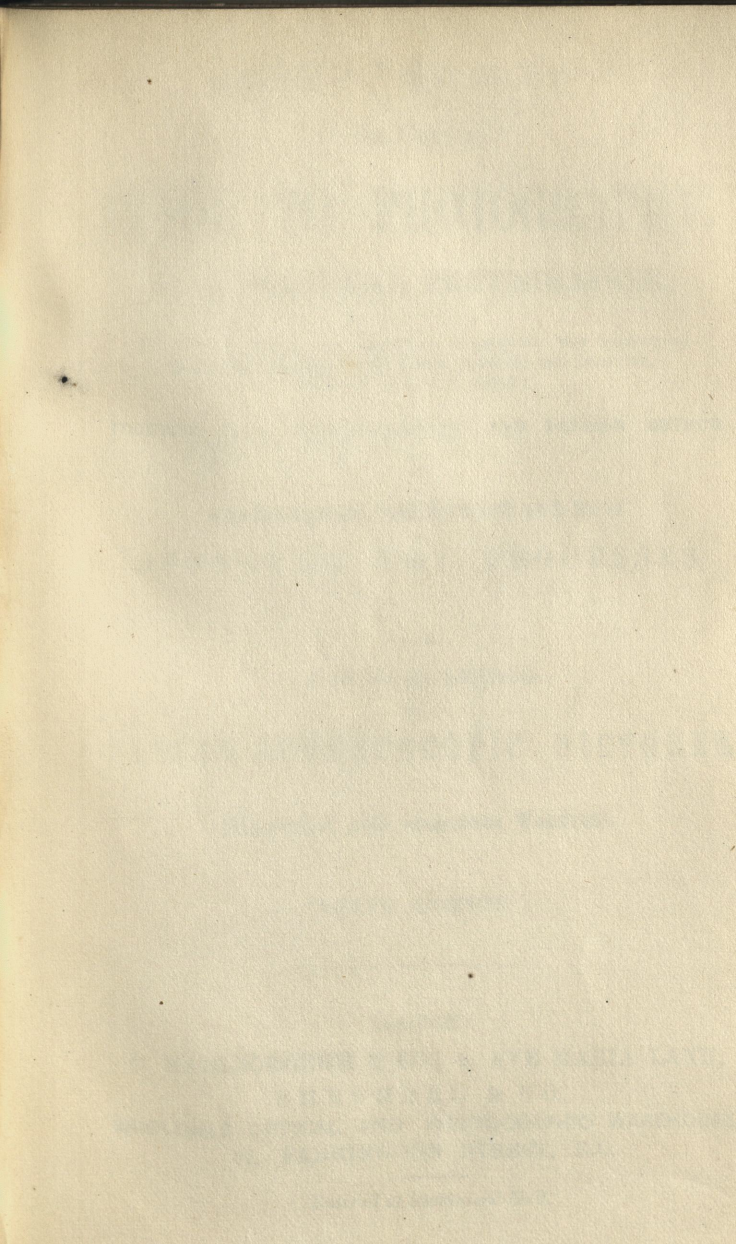
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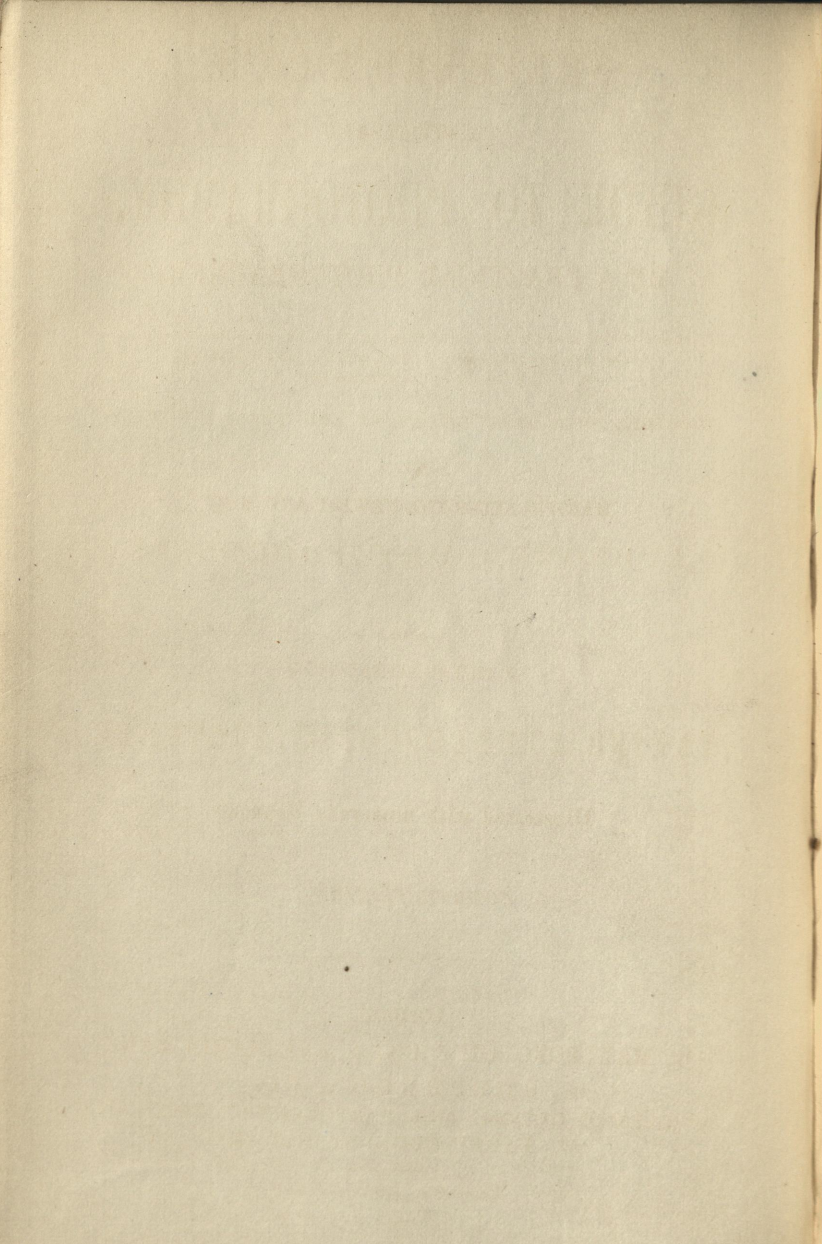
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WHOLESALE OPTICAL AND PHOTOGRAPHIC WAREHOUSE
97, FARRINGTON STREET, E.C.

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FOOTPRINT WITH FULL DIRECTIONS AND PRECISE METHOD

OF

MANIPULATING THE NEGATIVE AND POSITIVE

APPROVED BY THE PHOTOGRAPHIC SOCIETY

LONDON:

PRINTED BY ADAMS AND GEE, 23, MIDDLE STREET,

WEST SMITHFIELD, E.C.

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PREFACE.

It is now upwards of twenty years since Daguerre succeeded in fixing, permanently, by means of the camera and lens, his first picture on the silvered plate; since which time, and particularly within the last few years, Photography has made such astonishingly rapid strides that it is almost with difficulty we are enabled to keep pace with it. Society of all grades (even from the throne itself) practise it, and our most scientific men have lent their best energies to further the advancement of this delightful art; it has not only become a source of amusement to many, but it in fact forms the means of existence to thousands. So greatly has the advantages of Photography been demonstrated, that it is now thought to be a necessary branch of education in many of our collegiate, naval, and military establishments, and in every expedition it forms a principal appendage. It would be difficult to estimate the importance in which it is held in the arts and sciences; the architect, engineer, or manufacturer can, by its faithful and unerring power, render it subservient to their wants in producing representations of their works and productions, no matter how elaborate, in their various states of progression. By its means we are enabled to pourtray, in the most truthful manner, the portraits of our friends and relations, and also the various foreign countries in which their duties or inclinations may lead them. Within the last year or so there have been several dry processes introduced, by which means we are enabled to prepare a number of plates which will keep their sensitive properties

for an almost indefinite period, and the tourist need carry nothing more than his camera, lens, and stand, and his box of prepared plates, and upon his return, develop them at pleasure.

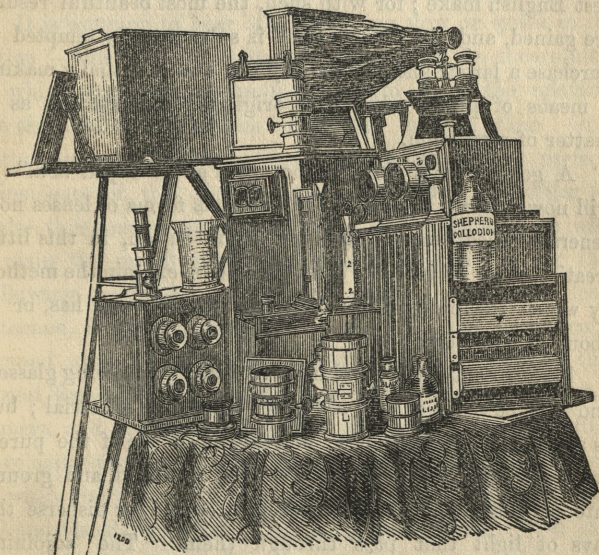
Photography is strictly a chemical application, and requiring great cleanliness for its successful practice. Much of the mystery that formerly surrounded it has disappeared, and frequently an amateur is now enabled to correct and enlighten many of the pseudo professional Photographers—whose sorry productions and mechanical manipulations do not entitle them to rank as artists.

Not laying claim to any particular originality, I have endeavoured, in these few pages, to give such clear and concise instructions, that, if the beginner will but strictly adhere to them, with care and attention, he cannot fail in producing pictures pleasing to his friends, and that which is much better, satisfactory to himself.

J. S. E.

London, 1860.

GUIDE TO PHOTOGRAPHY.



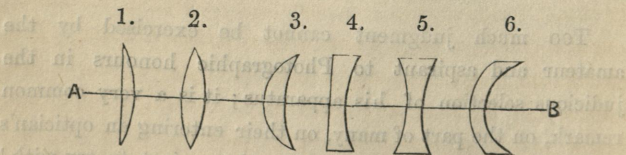
CHOICE OF APPARATUS.

Too much judgment cannot be exercised by the amateur and aspirant to Photographic honours in the judicious selection of his apparatus; it is a very common remark, on the part of many, on their entering an optician's shop, that they require something cheap, just to try with! This is a fatal conclusion to arrive at; as bad and imperfect

materials,—and particularly bad lenses,—inevitably cause the beginner, after much waste of valuable time, to be nothing more than a beginner, and eventually giving it up with disgust; consigning his apparatus to the lumber room, and the study of Photography to oblivion. If a cheap apparatus is required, the smallest size should be purchased, and of the best English make; for with such, the most beautiful results are gained, and the manipulator is subsequently tempted to purchase a larger and more costly set, and eventually making a means of profit what was originally undertaken as a matter of recreation.

A good lens is the Photographer's "*sine qua non*." I will now proceed to describe the various forms of lenses now generally used, and as it is not my intention, in this little treatise, to go far into the theory of optics, explain the method by which the manipulator may test the lens he has, or is about to purchase.

Lenses, commonly speaking, are called magnifying glasses, and may be made of any ordinary transparent material; but as applied to Photography, is generally made of the purest and most colourless glass that can be procured, and ground into segments of spheres, in order to collect or disperse the rays of light that pass through them. The adjoining figures represent the various forms that are made use of in camera lenses.



1, is called a plano convex lens.

2, is a double convex lens.

3, is formed of parts of two circles of different diameter, and is called a meniscus lens, or concavo convex.

4, is a plano concave.

5, is a double concave lens ; and

6, is a concavo convex formed of parts of the inner surfaces of two dissimilar circles.

It is common to hear of a lens being slow or quick in its action ;—this is purely accidental, arising from the uncertainty in which all opticians remain, at present, as to the relation the chemical and luminous forces bear to each other. One of the causes of rapidity of action in a lens is the perfect coincidence of the chemical and visual foci. In order to make this remark more intelligible to the beginner, I will explain the meaning of chemical and visual foci by the following example :—When a camera, with the lens attached, is placed upon the stand, and the view finely focused upon the sheet of ground glass, this is called the visual foci—then, if a plate is prepared, and stood in the camera, and the light allowed to strike upon it ; and after developing the result of the picture is sharp in every respect as when viewed upon the transparent glass, then the chemical and visual foci agree ; but if, on the contrary, when the view is developed, and there is an indistinctness and want of sharpness about it, then the chemical does not agree with the visual foci, and the lens should be rejected. Another course of quick action in a lens is its shortness of focus. The greater the length of focus a lens may possess, the larger surface will it cover, but necessarily requiring a somewhat longer period of exposure. The question is frequently asked, why a lens that covers a surface of 9 by 7 cannot cover 9 by 9 ; the reason is, that if we draw a circle of the size,

properly covered by a 12 inch focus lens, and make a square, as represented by the letters *a, b, c, d*, Fig. 1., we can see that, by taking an inch or so from off the side, we can add it to the other, without going out of the circle, as seen by the dotted lines ; so that a lens of 12 inches in focus, covering

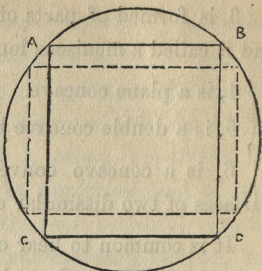


Fig. 1.

8 inches square, is not half so quick in action as a lens of 6 inches focus, covering 4 inches square, for the amount of light reflected from the same object is four times as much in one case as in the other. Therefore, when requiring to copy objects quickly, we must make use of *two large lenses*, placed a certain distance from each other, by which the length of focus is diminished, and its rapidity of action increased ; the back lens catching the refracted rays of the front, and refracting them still more. By this means we obtain what is called a double combination, or portrait lens.

Fig. 2. represents a section of a double combination, or portrait lens ; the front lens, *A*, consists of two glasses cemented together, the flattest side of which is turned towards the camera. The least convex side of the back lens,

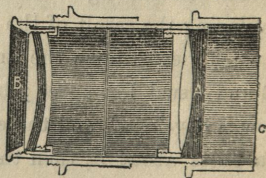


Fig. 2.

B, must also be placed towards the camera. To separate the glasses in the lens, *B*, a metal ring (as shewn by the black line) is placed. *C* is what is termed a hood, for preventing the light from striking upon the front lens, *A*, and great care must be used when the lenses are separated, for the purpose of cleaning them, that they are restored again in their

proper position ; for it frequently happens, that persons, unacquainted with their nature, after having used a lens for a length of time, *clean* it, and then suddenly discover, that by some cause it has lost its power of working, and write to the tradesman, from whom it was purchased, giving a long list of its faults ; or else sending it to be repaired, and thus causing themselves to be put to an unnecessary expense and inconvenience.

Fig. 3. represents a sectional view of a landscape or view lens ; this has but one lens, *A*, the convex side of which is placed next the camera. This lens has no hood upon it, as in portrait lenses ; from the lens being so far from

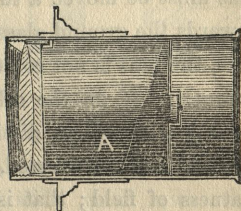


Fig. 3.

the front there is no necessity for it. Three stops of different size openings are always used with landscape lenses, and the use of each must be left to the judgment of the operator. In copying objects that are not well illuminated, or taking views in dull weather, the larger stop must be used ; the middle size stop is used when there is a moderate light, and the smallest one when the light is very strong, or when great sharpness of detail is required.

An excellent little piece of mechanism, called a focimeter, the invention of M. Claudet, is frequently used by the generality of Photographers for testing the quality and working of their lenses ; it consists of a number of fan-like pieces of metal (generally tin), placed at different distances from each other, and fixed upon a tube, or stick, resting at either end upon two uprights, which are fixed to a wooden block, as seen at Fig. 4. The fans are numbered from 1 to 8 in the engraving. The artist, wishing to test his lens, focuses

a certain number, say No. 5 ; when, if that number proves to be most sharp and distinct, then the lens is properly corrected, and it works to focus ; if 3 or 4 should prove the sharpest, then, by the means of the rack and pinion, the lens must be moved a turn or two towards the ground-glass ; in this case, the lens is not corrected sufficiently. If, on the other hand, 6 or 7 is the most distinct, then

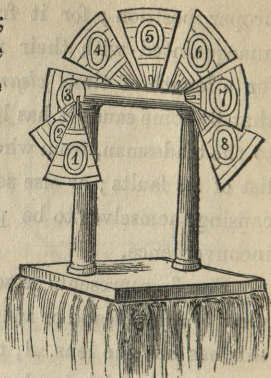


Fig. 4.

the lens is over-corrected. Another feature in a good lens is its flatness of field ; that is, the covering of the plate fully the size it is warranted, or stated to do, and in giving the lines perfectly straight. I have known many people (amateurs especially) rejecting lenses of most perfect definition, and in every respect good, simply because they saw a spec, or air bubble, in the glass ; this is a great mistake, as it is not possible for the optician always to see them in the glass, until it has been worked, and when found, would not be noticed by him so long as the metal had its proper density, and its curves correct. I have seen a lens, with large pieces chipped from its surface, work equally as well as when first used, but my readers must not, on this account, select lenses that are chipped or defaced : I merely wish to prove, that such blemishes as bubbles are not of the least consequence.

THE CAMERA.

After the lens, the most important instrument to the pho-

tographer is his camera. Fig. 5 represents the form of camera most generally used in the operating room ; this consists of a fixed body *A*, on the front of which the lens *B* is screwed, an inner body, *C*, slides light-tight into *A*, sliding on the bottom board ; *D*, which is screwed on the fixed body, by this means a great range of focus is obtained, and is found to be

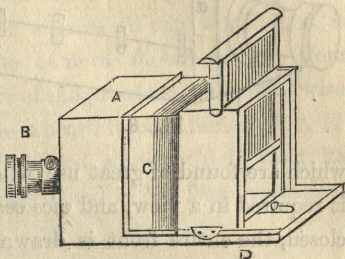


Fig. 5.

of great importance when large portraits, or copies of pictures, small enough for brooches or lockets, are required.

Fig. 6 is the form of dark slide used with the camera, Fig. 5. There are several kinds of cameras made for portraiture or landscapes, all of which are much used, and, from their peculiar construction, are named accordingly. The one just described (Fig. 5) is called the sliding-body, or expanding camera. The rigid camera (Fig. 7), is one by which the focus is obtained only by the lens, either rack or pinion or sliding tube. Fig. 8 is

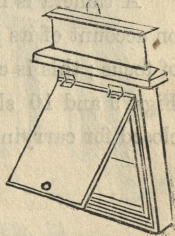


Fig. 6.

the folding camera ; this engraving represents the folding camera when open for use ; this, like the rigid camera, is a single body, with this exception, that there are several open-

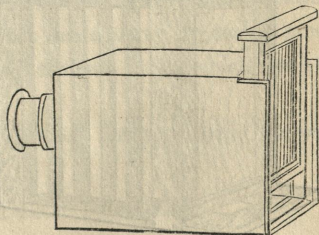


Fig. 7.

ings in the top, for the focusing glass or dark slide, so that

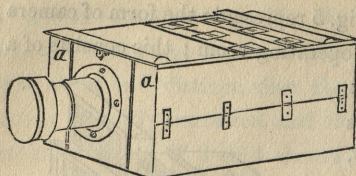


Fig. 8.

lenses of different focal length may be used; this camera has one or two motions in front of it, on which the lens is screwed, and are called the vertical and horizontal fronts,

which are found of great use when more sky or foreground is required in a view, and *vice versa*. When required to be closed, the entire front is drawn out at *a, a*, and the dark slides and screen from the top openings, the sides then fold inwards, and the top falls flat with the bottom; the whole can then be packed with lens, &c. in a leather case, and forming a very compact arrangement.

A camera is much used now, in preference to the above, on account of its great portability, lightness, and great range of focus; this is called the shutter bottom Bellows Camera. Figs. 9 and 10 show this form of camera, open for use, and closed for carrying:—

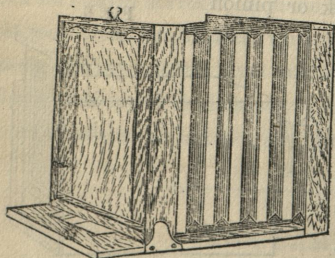


Fig. 9.

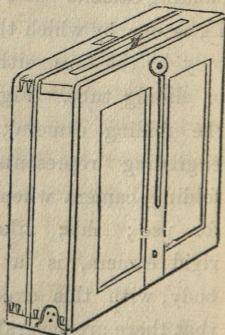


Fig. 10.

THE CAMERA STAND.

The next article that comes under our consideration is the camera stand, and to ensure success in our working, it is positively necessary that the camera should be free from vibration during the exposure of the prepared plate, otherwise a clear and sharp picture cannot possibly be obtained. Fig. 11 represents the best form of tripod stand, which, from its peculiar make, has great strength, and is free from vibration.

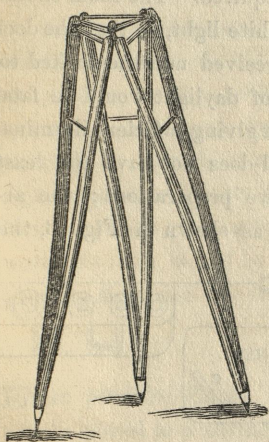


Fig. 11.

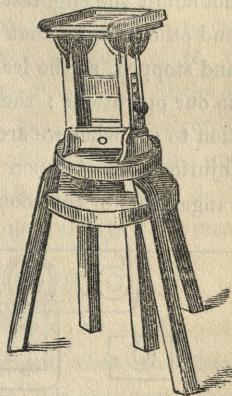


Fig. 12.

Another form of stand, intended only for the operating room, is shown at Fig. 12 ; it is made heavy, to ensure great steadiness, and has several adjustments in it, which are exceedingly useful.

The beginner having purchased his apparatus, we will now proceed to describe

THE COLLODION PROCESS.

THE DARK ROOM.

Having chosen the room intended for the dark chamber,

the first thing to bear in mind is to keep it, where practicable, solely for the purpose intended. If the room be an ordinary bed-room, and only one window in it, commence by tacking a double thickness of black material upon the upper half of the window, so as to exclude all light from it; upon the lower half must be tacked, in the same manner, three thicknesses of bright yellow calico, this will be found to give plenty of light for our purposes, and allow the window to be opened to admit fresh air when required. The room should not admit the slightest gleam of white light, so that the door and other chinks that may be perceived must be looked to, and stopped, as the least amount of daylight would be fatal to our operations; the yellow light giving sufficient illumination to see what we are about, and does not have the least injurious effect upon our sensitive preparations; the arrangements of the room should be as shown in Fig. 13, the

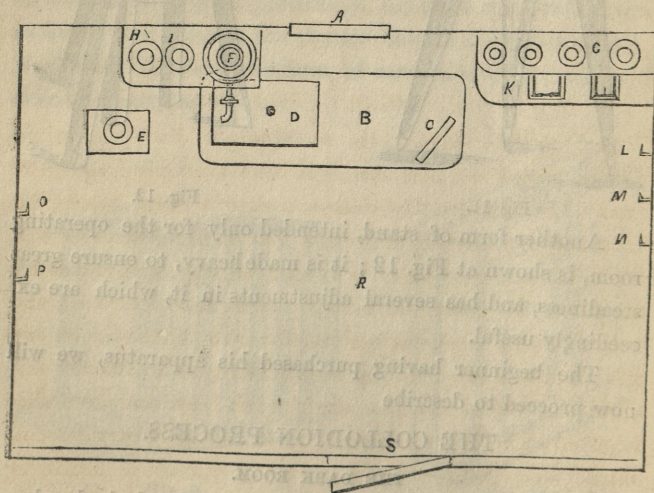


Fig. 13.

view of which is supposed to be seen from the roof:—*A* is the window, *B* the table, upon which stands the bath *C*, and the deep tray, *D*, with a hole in the middle, and stem passing through the table, with a piece of tube attached, to allow the washings to run into a pail underneath the table; *E* is a small table for the fixing solution, which should be kept at a distance from the bath; *F* a small cask of water, with tap, for washing the plates; *G* a shelf for the collodion and unmixed chemicals; *H*, *I*, the bottles of developing; *K* a shelf for the dark slides, and clean glass, on nails, underneath which, some hooks should be fastened in the wall, to hang up the carriers, or plate-holders, when not in use; *L*, *M*, *N*, hooks for leathers and clean cloths; *O*, *P*, nails for cloths or dusters; *R*, the body of room; *S*, the door. Candle-light is objectionable, as it acts perceptibly upon the sensitive surfaces; a yellow glass lamp should be used. After each day's work, *the room should be swept out, and always kept scrupulously clean and free from dust.*

THE GLASS ROOM,

Where possible, should be so arranged, that the sitter may be placed in a northern light; one side only need be of glass. The roof, directly over the sitter's head, should be darkened by a screen, projecting four or five feet, otherwise it would cause heavy shadows under the eyes, nose, and chin; the side of the room that is not of glass should be that side where the sun mostly shines; receiving the light only on one side enables us to produce those pleasing and delicate shadows that are so much admired in first-class operators' productions. The sun, wherever it strikes strongly on the room, should, by a judicious arrangement of curtain or blinds, be

kept off. When a glass room is not available, the garden may be used. When such is the case, a screen (which can be an ordinary dark table-cover) can be hung on one side, at right angles to the back-ground, and a dark screen over the sitter's head, projecting four or five feet from the wall. I have made an ordinarily well-lighted room answer to great advantage, by the following method:—Parallel with the window, at a distance of six feet, a white screen is placed, and the back-ground between the two, and at one end of the window, so that the light shall be full on the sitter; the white screen reflecting back a portion of the light on the other side of the sitter's face, which would otherwise be too much in shadow; along the top of the window another piece of white calico should be tacked, the other end or side should fall over the screen.

CHOICE AND PREPARATION OF THE GLASS.

Decidedly the best glass for Photographic purposes is Patent plate, but when this cannot be procured, the best flatted Crown should be used. The inferior kind of glass generally has a scratchy and rough surface, and is seldom flat, which latter fault is of serious inconvenience, as they are apt to throw a picture out of focus, and to be broken when subject to the slightest pressure during the printing process. Before cleaning the glass their edges should be carefully roughened, either with a file, or stick of composition sold for the purpose; a very good way is to draw the edges of two pieces of glass along one another. Then prepare the following mixture:—alcohol, 1 ounce; liquid ammonia, 2 drachms; 3 ounces of water; 1 ounce of tripoli.

Lay the glass upon a piece of cloth, on a flat surface,

and, with some cotton wool made into a ball, moisten it with the above solution, and rub the glass hard and evenly upon each surface; as each glass is so prepared, put it into a dish of clean cold water, until the whole are finished; take them out one by one, and stand them up to drain, their edges only resting against each other. Wipe them with a dry cloth, one that has been washed in water only, and without soap; then polish with a clean chamois leather. Before deciding that your glasses are clean, hold it in an angular position, and breathe slightly on its surface, if the moisture flies rapidly and evenly off, then the glass is clean; if, on the contrary, it goes off in streaks and patches, it must be cleaned again.*

THE COLLODION.

I would not advise the amateur and beginner to make his own collodion, for, in most cases, he would meet with disappointment and useless expense. There are now so many well-known collodions sold, that there is hardly any limit for his selection, and I would here suggest to the manipulator who has obtained a collodion that gives him satisfaction, to keep to it, and not to be constantly trying others that his friends may recommend him, for, by so doing, he will only meet with constant failures and annoyances. Having purchased the Positive Iodized Collodion, enough should be poured for the day's use into a collodion bottle, or pourer, of a two ounce capacity, or more, as may best suit, similar to Fig. 14.

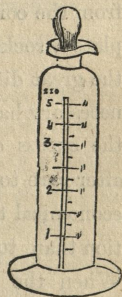


Fig. 14.

* An excellent Solution, for cleaning glass, and called a Deturgent, is sold by Shepherd and Co.

We now proceed to the operation of

COATING THE PLATE.

Perhaps there is no operation in the whole process that appears more simple to the beginner, and yet so difficult to acquire, as that of coating, with an even surface, the plate with collodion ; and although I have endeavoured, in the following instruction, to give the directions I think best, yet, a practical illustration from a brother photo. would be the means of saving much time and collodion. Holding the glass in the left hand, at the corner *A*, Fig. 15, keeping the glass level, pour into the centre of the plate a sufficient quantity to cover its surface, then allow it to run to the corner *C*, from thence to *B*, then towards *A*, being careful that the collodion does not touch the thumb ; then pour off, and drain, from the corner *D* into the bottle ; whilst draining, give the plate a rocking motion from *A* to *D* until the film has set, the great difficulty in the way of getting an even film is unnecessary haste, for, if the glass is raised too quickly to return the excess of collodion, it is impossible by any amount of after care to make it even ; therefore, it will prove more economical to sacrifice a small quantity of ether by evaporation than to spoil a picture by not giving sufficient time. When the collodion gets thick from use and loss of ether, more should be poured from the stock-bottle into the pourer. When the glass is too large to coat conveniently by the above method, we should have recourse to the pneumatic plate-holder. When used, the plate should be laid flat upon the leather, and the holder held in the left hand ; by pressing

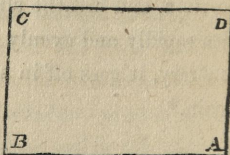


Fig. 15.

the body, the air is exhausted ; the top should then be placed on the surface of the glass in the centre, and by relieving the pressure of the body, the holder, with the plate firmly attached, is taken up ; the top surface of the glass is then carefully dusted with a soft brush for the purpose, and the plate then coated in the ordinary manner. When coated, it is removed by simply pressing firmly the body of the holder again. Around the neck of the collodion bottle, a film forms ; when in use, this must be carefully removed, otherwise, portions of it may fall on the plate, and render it useless. The plate being coated with collodion, we next proceed to

EXCITING THE FILM IN THE POSITIVE BATH.

Crystallised Nitrate of Silver	-	-	-	-	1 $\frac{1}{4}$ ounces
Nitric Acid	-	-	-	-	10 minims
Alcohol	-	-	-	-	5 drachms
Distilled Water	-	-	-	-	20 ounces.

Dissolve the silver in 10 ounces of water ; then dissolve $2\frac{1}{2}$ grains of pure iodide of potassium in 2 drachms of water ; add this to the solution of silver, when immediately a yellow cloudiness of iodide of silver is formed, which, by shaking, is dissolved. Allow this to remain a few hours, say three or four, when add the remaining 10 ounces of water to it ; shake well, and filter it into a clean stoppered bottle ; when filtered, add the nitric acid and alcohol.

A retort, or filtering stand, would be found of great service, as it allows the filtration to proceed more rapidly, by keeping only the narrow part of the stem of the funnel in the neck of the bottle, as seen in Fig. 16. When the

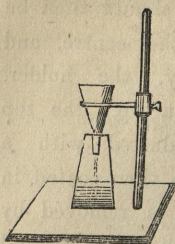


Fig. 16.

solution is filtered, pour a sufficient quantity into your bath (having previously been well rinsed out with distilled water) to cover the size plates you are using ; then place the glass, collodion side from you, on the lip of the dipper, and with one steady motion, immerse it into the bath ; being careful neither to hesitate or stop for a moment, otherwise a line will be formed wherever the stoppage may have occurred, and the plate spoilt.

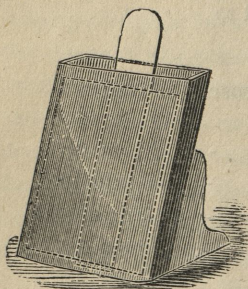


Fig. 17.

Fig. 17 represents the bath and dipper. When the plate is immersed in the exciting bath, leave it ; and wipe out your dark slide, then cover your bath with a dark cloth, free from dust, and proceed to arrange and focus your sitter, or object to be copied. This being done, return to your dark room, close the door gently, and if a minute has elapsed, draw the plate, within an inch or so, from out of the bath three or four times, to allow the ether to evaporate, and the streaky or oily appearance (which it then has) to disappear ; replace it again in the bath, and let it remain until the greasiness has gone, and the solution flows smoothly over it. When the temperature is about 60° , the time for its immersion is about two minutes ; when below that temperature, a little longer time should be given. The plate being ready, remove it from the dipper, and holding it by the two sides, allow it to drain thoroughly into the bath about a minute ; in fact, until nearly dry, for many

pictures are spoilt by placing them too quickly into the slide, causing stains and other markings on the plates. When the plate is drained, place it in your dark slide, and put it near your camera ; focus carefully your object, place the cap on the lens, withdraw the focussing glass, put it safely on one side, and insert quickly your dark slide, draw up the shutter gently, and remove the cap of the lens and give it

THE EXPOSURE.

This is a great difficulty for the amateur, at first, to get over, as so much depends upon the position he may have chosen for operating, and the intensity of the light ; but positives generally require but a short exposure ; with a good English combination portrait lens in a good light, the exposure will vary generally from 2 to 10 seconds—practice alone, however, must determine. If, for instance, we find those parts which were less illuminated than the others appear as quickly on developing, then the plate may be considered over-exposed—if, on the contrary, they appear very slowly, then it has not had sufficient time. In a picture that has been rightly timed, we should see first the face and hands appear, then the whites of the dress. I generally make it a rule, when the face and hands have appeared, to throw off the developing solution, and hold the plate up to the yellow light, until the pupil of the eye is distinct ; from the peculiar nature of the positive developing solution, the picture comes out very quickly ; its formula is as follows :—

POSITIVE DEVELOPING SOLUTIONS.

Proto-sulphate of iron	-	2½ drachms
Glacial acetic acid	- -	2 drachms
Pure nitric acid	- - -	5 minims
Alcohol	- - -	2 drachms
Distilled water	- - -	10 ounces.

Dissolve the iron in the water, filter the solution, and then add the acids and alcohol. Another developing which is much used by Photographers, producing pictures of a very pleasing description, is prepared as follows :—

PROTO-NITRATE OF IRON DEVELOPING.

Proto-sulphate of Iron	-	-	$\frac{3}{4}$	ounce
Nitrate of Baryta	-	-	$\frac{1}{2}$	ounce
Alcohol	-	-	$\frac{1}{2}$	ounce
Pure Nitric Acid	-	-	20	minims
Water	-	-	8	ounces.

Procure a small porcelain or wedge-wood pestle and mortar, and reduce the nitrate of baryta to a fine powder; then obtain a clean porcelain evaporating dish, in which pour the water; place the bottom of the capsule upon the large ring of the retort stand, and a spirit lamp underneath it; when the water boils, put in the powdered baryta, stirring continually till dissolved; when dissolved, add the sulphate of iron, previously reduced to powder also, stir well for a minute or two, until thoroughly mixed; then remove the lamp, and allow the milkiness to subside; after a lapse of about fifteen minutes, a white powder will have settled at the bottom of the dish, pour the clear solution into a funnel, and filter twice. If the operation has been conducted precisely as described, the resulting solution will be of a pale green colour. When cold, add first the nitric acid, and then the alcohol; if the solution, when made, measures less than 8 ounces, make up the quantity with distilled water.

The plate having been exposed, replace the cap of the lens, and push down gently the shutter of the dark slide, not with force and a bang, or your labour will be rewarded by a number of dirty spots and stains. If your slides get

damp from use, or otherwise, be sure to have them perfectly dry and easy, before operating.

DEVELOPING.

On entering the dark room, close the door, place the slide down in the same position as when taken from the camera ; and pour out your solution for developing, into a glass for that purpose,—a 1-ounce measure being as good a thing as any,—then remove the plate from the slide, and holding it by the corner *A*, Fig. 18, pour on a sufficient quantity to cover the plate, commencing at the corner, *A* directing the hand whilst pouring towards *C*, and allowing the end *D B* to incline downwards as the solution runs towards it, and let nearly the whole run off into the basin, or trough ; then, by moving the wrist, cause the

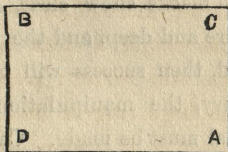


Fig. 18.

remaining solution to flow from end to end, holding it up and looking through it, observe the amount of intensity, as before described. When the development has proceeded far enough, hold it under the tap, in a horizontal position, and allow a stream of water to flow over it, to remove the whole of the developing. The plate must not be held at too great a distance from the top, nor must it be at all inclined, or possibly the film may be broken, or removed from the glass. The plate being developed, it is then ready for

FIXING THE IMAGE.

Dissolve 2 drachms of cyanide of potassium in 10 ounces of water, in a bottle kept only for this purpose. (Be sure to label this bottle carefully, as it is a highly poisonous salt—as also are many others used in Photography ; and therefore

care should be taken that children, or persons ignorant of their use and properties, cannot get access to them.) Pour a little of this solution into another small measure, and pour this over the plate in the same way as the devolving, when the yellow iodide will dissolve, and the picture gradually show itself. When the picture is fully brought out, throw off the solution, and well wash the plate, so as to remove every trace of the cyanide, otherwise the picture would be gradually eaten away. The picture being washed and dried, it is now unalterable by light, and by placing a piece of black velvet behind it, examine its appearance, when, if the blacks show clear, and without cloudiness, the whites pure and deep, and the different gradations of tone preserved, then success will have been achieved; if, on the contrary, the manipulation is somewhere at fault, another trial must be made. Carelessness, or neglect to follow the various details, will invariably lead to failures; therefore, I recommend all who are really anxious to become proficient in this delightful art, not to judge for themselves, nor to avoid those minor details which are so absolutely necessary to success.

FINISHING THE PICTURE.

The plate being dried, and free from any moisture whatever, now requires to be backed up with varnish; obtain a bottle of black varnish, and, in the same manner as collodion, pour, on the plain side of the glass, sufficient to cover it, returning the superfluous quantity back into the bottle; then stand it on a shelf, with its face to the wall, to dry, which with some varnishes, is done in about 10 or 15 minutes; it can then, if required, be tinted with dry colours, and using small soft brushes for the purpose. Attaching much import-

ance to this subject, I have, in another part of the work, given full instructions how to colour glass pictures. The portrait, thus backed and coloured, is reversed or inverted as regards position; that which was placed on the sitter's right will now appear in the picture on his left hand. If this is an objection, it can be remedied by pouring the black varnish upon the prepared or collodion side of the plate; but, as the varnish is liable to crack, or get scratched, it is as well not to pour it on the picture. Some operators back up their pictures with black velvet, which can be placed in contact with either side. Whatever plan is followed, the picture has then to be preserved from the action of the atmosphere, and should be put into a case, or mounted in a passe partout.

THE NEGATIVE PROCESS.

When the amateur has mastered the positive process, but not till then, he can proceed to the taking of negative pictures; for, although the manipulation is similar in most respects to the positive, yet the results are required to be of such a different character that the greatest care and judgment must be used, as every imperfection upon the plate will be transferred to every proof that he prints.

THE NEGATIVE COLLODION.

The difference between the positive and negative collodion consists in the solutions used for iodizing them; and, although good positives are obtained at times from some positive collodions, yet, the results being uncertain, a negative one should be always preferred. The glasses being cleaned and coated with the collodion, in the same manner

as directed for positives, is then immersed in the negative bath, prepared as follows :—

NEGATIVE BATH.

Fused Nitrate of Silver	-	-	-	1½ ounces.
Iodide of Potassium	-	-	-	5 grains
Alcohol	-	-	-	2 drachms
Sulphuric Ether	-	-	-	2 drachms
Acetic-Acid	-	-	-	5 minims
Distilled Water	-	-	-	20 ounces.

Dissolve the silver in 3 ounces of the water, in a bottle ; then, in 2 drachms of water, dissolve the iodide of potassium ; add the two together, and shake the bottle well, when the precipitate will be dissolved, then add the remaining 17 ounces of water ; the precipitate, or iodide of silver, which is formed will be again thrown down, but in a finely divided state ; shake the bottle well for about five minutes, then let it stand about an hour, and add the alcohol, ether, acetic acid, and filter. It will be found of great service to make a larger quantity of bath than you immediately want, and keep as a stock bottle, to replace the quantity you gradually use, so as to maintain an uniform strength. Allow the prepared plate to remain in this bath about three or four minutes ; but, previous to taking it out, draw the plate up and down three or four times, drain it, place it in the dark slide, and place a piece of Papier Joseph behind it, to absorb the moisture.

EXPOSING THE PLATE.

It is hardly possible to give any rules for the required time for the exposure of negatives, as nothing but experience and attention to the various symptoms seen in the developing of the picture, can afford the manipulator any assistance.

Negatives require, on an average, treble the exposure that a positive takes ; the light, the same lens and other circumstances, being the same.

DEVELOPING THE NEGATIVE.

As I have stated, that with the exception of a longer exposure, and the using of negative instead of positive solutions, the two processes are conducted in a similar manner ; but when the proposed negative is about to be developed a material difference has to be made. In developing a positive, the amateur is very likely to carry the development too far, as, in that process, the solution should be thrown off the plate as quickly as possible, and as soon as the indications before pointed out are observed, the plate should be washed ; but in the negative, the solution must remain upon the surface, tilting it backwards and forwards, until the whole of the details are well up, and those parts of the picture that were white in the original are nearly opaque in the negative, and the shadows remaining unaltered, under the influence of the developing solution. The formula I have found best for direct negatives is as follows :—

Pyrogallic Acid	-	-	-	-	6 grains
Glacial Acetic Acid	-	-	-	-	2 drachms
Distilled Water	-	-	-	-	4 ounces.

Dissolve the pyrogallic acid in the water, then add the acetic acid, when it must be carefully filtered, to render it clear. In developing the plate, hold it in such a position that the surface can be distinctly seen, so that the development can be stopped at any moment, when, as soon as the lights and whitest parts appear, and then the details, pour back the solution into the measure, and holding the plate so that it can be seen through, it will be seen that the lights

are getting opaque; should they not do so as quickly as they ought, draw the dipper from out of the bath, and allow about ten drops or more of the silver solution to drop into the developing, which pour on to the plate until sufficient density is obtained. As soon as the negative solution gets thick and turbid, which it very soon does, and leaving a kind of sandy deposit upon the plate, throw it away, rinse the measure, and pour out a fresh supply. The development of a plate that has been correctly exposed is difficult to spoil; but, on the other hand, if under-exposed, any amount of verbal instruction could not assist the amateur, as a few failures and a little practice would be of much greater service.

FIXING THE NEGATIVE.

The negative having been properly developed, remains only to be fixed, and washed with plenty of clean water. I prefer the following formula, as the iodide is much more quickly dissolved than with soda; but I have given the formulas for both, so that the operator can choose either:—

Cyanide of Potassium	-	-	-	12 grains
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Water	-	-	-	-	1 ounce.
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OR,

Hyposulphate of Soda	-	-	-	5 ounces
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Water	-	-	-	-	10 ounces.
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This former solution should be poured on to the plate, and as soon as the iodide has dissolved, and the picture clear, to be thrown away. The latter solution can be placed in a porcelain dish, and the plate immersed in it till cleared, and can be used again and again, until too weak for use.

CONVERTING POSITIVES INTO NEGATIVES.

Many of our eminent Photographers now prefer converting their positives into negatives, instead of taking them direct ; there are several methods, but the following I have found to answer well :—Proceed to take the positive in the ordinary manner, using, in cold weather, 20 grains of iron instead of 15, and, in developing, keeping the solution upon the surface until the whole of the details are distinctly seen ; the plate is to be then washed, then, with a solution of pyrogallic acid, 2 grains ; acetic acid, 10 minims ; water, 1 ounce ; pour this over the plate, and allow it to flow backwards and forwards two or three times, then pour back into the measure again ; withdraw the dipper from the bath, and allow about 12 drops to fall into the solution pouring off and on until sufficient density is obtained, which can be ascertained by looking through it ; when the picture is sufficiently intense, wash well, fix, again wash, dry, and varnish with a good spirit-varnish. The next method (first introduced by Mr. Archer) is by using, instead of the pyrogallic, the following :

Bi-chloride of Mercury	-	-	1 drachm
Water	-	-	3 ounces
Muriatic Acid	-	-	5 minims.

Pour on a sufficient quantity of the above solution, and allow it to remain until the lights of the picture are brought out quite white, at which stage the plate must be well washed with water, and then with a solution composed of

Liquid Ammonia	-	-	1 drachm
Water	-	-	1 ounce.

Pour some on the picture at one corner, and allow it to run evenly over the glass, when a deep-toned negative will be soon formed. As this latter liquid causes the film to be very

tender, great care must be used in washing the plate after its use, or it is very likely to break; therefore, the water should be poured on the centre of the glass in a small and gentle stream. I have devised a converting solution free from corrosive sublimes, which will either produce a positive of a very pleasing description or a deep-toned negative, at the option of the operator.* In whatever manner the negative is produced, it has then to be varnished to protect the film from injury during the process of printing. A good spirit varnish should be obtained, which can be used without heat, (as it is not always convenient to have a fire at hand) giving a transparent, bright, and hard film. The negative being varnished and thoroughly dry, we next proceed to the

PAPER AND PRINTING PROCESS.

The apparatus for this process is neither great nor expensive, all that is necessary is as follows:—

A printing or reversing frame.

Four porcelain dishes; three shallow, and one deep.

Glass measure.

Glass rod.

Two bone forceps.

Bibulous paper.

PLAIN SALTED PAPER.

Rive or La Croix positive, or Hollingsworth's, are the best suited for this purpose.

Chloride of Ammonium	-	-	3 drachms
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Distilled Water	-	-	20 ounces
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Filter this solution into a shallow dish, and having

* The "Mirabilis Solution" to be had of Messrs. Shepherd & Co.

selected a sheet of paper cut to the proper size, hold it by the thumb and fore-finger of each hand, and bend the paper, and place the centre on the solution and lower gradually each end until the whole of the sheet is in contact ; after the sheet has been on the solution a few seconds, raise one end gradually with a pair of forceps kept for this purpose, and observe whether there are any air bubbles on its surface, if so, by raising the paper two or three times, they can be displaced, or they can be broken by means of the glass rod ; the paper is then allowed to remain in contact for three minutes, when it is to be removed from the solution and hung up to dry at one of its corners by a pin bent in the shape of the letter S, the point of which is passed through one corner of the paper and the other side hung across a piece of string. The wooden clips are the most suitable for this purpose : they are sold at the rate of 1s. per dozen. A piece of bibulous paper, about an inch square, should then be placed at the corner to absorb the solution that drains off the sheet.

As the paper at this stage is not affected by the light, the sheets, when dry, can be kept for an indefinite period in a drawer or portfolio ; it is as well to mark each sheet as it is salted, so as to know which side is prepared or not. The above solution after use can be bottled and used again.

RENDERING THE PAPER SENSITIVE.

Nitrate of Silver	-	-	-	50 grains
Distilled Water	-	-	-	1 ounce

When the above salted paper is required to be made sensitive, prepare a solution of the above strength, according to the quantity required ; filter it into a shallow dish, kept for this purpose only, to the depth of a quarter of an inch, and in the same manner as described for the salting, float

the salted side of the paper upon the solution, and allow it to remain upon it for five minutes, at the end of which time remove it very carefully by means of another pair of forceps ; allow it to drain, and suspend it to dry by one of its corners, as before. The silver solution can be repeatedly used, but will require strengthening now and then. The paper thus prepared is very sensitive to light, and when dry, is ready for the

REVERSING OR PRINTING FRAME.

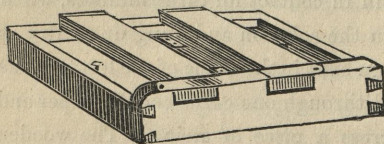


Fig. 19.

The printing frame consists of a framework of wood, with a bead or lip round it to receive a thick square of plate glass, upon which is placed an hinged board, lined with velvet or cloth ; on one side of the frame are hinged two pieces, or bars of wood, either with springs or screws attached, for the purpose of keeping the board and negative from shifting during the progress of printing, as represented in Fig. 19. If a sheet of silvered paper is exposed to the light, it will in a short time become blackened ; but if any opaque substance, be placed directly under, it will remain white—on this principle the positive pictures are produced. The negative being placed with the prepared surface upwards in the printing frame, a sheet of the silvered paper is then placed, sensitive side on its surface ; the hinged board is then put on, and the bars fastened across it ; the light is then allowed to shine on the negative, and in a few minutes, if we release one of the bars, and lift up one side of the hinged board, we shall find that a very decided action has taken place, and that a copy of the negative is gradually being produced. The board is again to

be closed, and the frame again exposed to the light; the paper is to be printed considerably darker than required, to allow for the change it undergoes in the fixing solution, which lightens the picture to a great extent.

THE TONING AND FIXING BATH.

Prepare a solution as follows :—

Hyposulphite of Soda	-	-	-	8 ounces
Water	-	-	-	20 ounces
Chloride of Gold	-	-	-	15 grains.

Dissolve the soda in 16 ounces of water, and the gold in 4 ounces, then gradually pour the gold solution into the soda, stirring well with a glass rod the soda whilst mixing; this will be ready for use, if prepared over night, by the following morning. On immersing the positive picture in this solution, the print quickly changes its color to a reddish brown, and gradually changes to a rich sepia, and finally to a black. At any moment the action of the bath may be stopped according to the shade or colour the operator may determine. Where a decided black is required, the picture should be considerably overprinted. This bath will keep for a length of time, occasionally strengthening it with soda, and a little solution of chloride of gold of the following strength :—gold 15 grains, water 8 ounces. The print having attained the required tone, is to be well drained, and then removed to a deep dish of water, tilting it to and fro to allow the water to wash its surface; continue this movement for a few minutes; change this water several times, at intervals of a quarter of an hour; then take the print or prints out, and place them in a large pan of water, in which allow them to remain for six or eight hours, moving them about occasionally; lastly, blot them with clean filtering paper, and hang them up to dry; it is

very necessary that the soda should be entirely removed from the print by the washing ; for if it is not, the picture will certainly fade. It was thought a sufficient test to taste the liquid that drained from a washed picture, and if it was at all sweet, the whole of the hyposulphite of soda was not removed. A better plan, and one far more certain, is to prepare a solution of protonitrate of mercury, a drop of which being put on the draining of a washed proof will give a black colour to it, forming sulphuret of mercury, and indicating that soda still remains, so that the prints must be again washed until no precipitate is formed.

A formula for toning is now much used instead of the old Hypo bath.

Instead of the ordinary toning-bath just described, the following is being used (first suggested by Mr. Maxwell Lyte) with great success, giving results of a superior description, and the pictures being less likely to discolour and fade. The formula I use is as follows :—

No. 1.	Phosphate of Soda	-	-	2 drachms
	Water	-	-	8 ounces
No. 2.	Chloride of Gold	-	-	15 grains
	Water	-	-	15 drachms.

To three ounces of No. 1, one drachm of No. 2 is to be added ; this forms the toning-bath.

The method of manipulating with this bath is as follows :—

When the print is removed from the pressure frame, immerse it in a dish of luke-warm water from 10 to 15 minutes, in order to free the paper from as much silver as possible, then take the print and place it in the toning bath (which should be heated to a temperature of 70°) ; take great care that the whole of the picture is covered by the solution, or

red and other marks and patches will inevitably form, when the picture is toned (which it will do in a very few minutes) to the taste of the manipulator, remove it to the fixing solution, composed as under:—

Hyposulphate of Soda	-	-	-	6	ounces
Phosphate of Soda	-	-	-	1	drachm
Water	-	-	-	20	ounces.

In which allow it to remain until it is cleared. The prints generally are fixed in about 20 minutes. Wash well and hang up to dry.

In working the above formula, great care must be used that the soda does not by any accident find its way into the toning bath, or it will decompose and spoil it.

ALBUMENIZED PAPER PROCESS.

Albumenized paper is prepared by floating one of its surfaces upon the whites of eggs salted with one of the chlorides, but as its preparation would be troublesome to the amateur, he had better purchase it; for unless he was an experienced hand, and wished to make largely, he would certainly get nothing but patchey, streaky, and dirty sheets of paper for his trouble.

Albumenized paper certainly gives much sharper outlines, and better details than the salted paper, although it does not bear colouring by the artist so well as plain, but from its glossy surface it is peculiarly well adapted for stereoscopic pictures. The albumenized paper is to be rendered sensitive in a bath of the following strength:—

Nitrate of Silver	-	-	-	60	grains
Distilled Water	-	-	-	1	ounce
Glacial Acetic Acid	-	-	-	3	minims.

FILTER.

Having prepared a solution of the above strength, pour a sufficient quantity into a shallow dish, and allow the paper to remain in contact about six minutes ; the sheet is to be then removed, and hung by one of its corners to dry in the dark. After a number of sheets have been sensitized in this solution, it acquires a brown colour, which can be easily removed by putting into the bottle a little powdered "kaolin," and shaking the solution, then filtering it when required for use. The process of printing, toning, and fixing, is conducted precisely the same as described for the salted paper, with this exception, that I prefer soaking the printed picture in a dish of distilled water about five minutes (face downwards) previous to placing it in the toning bath. It will be found that the albumenized paper requires a longer immersion in the ordinary toning bath, to get the darker tones, than the plain paper, and should have a greater amount of washing given it to free it from the hyposulphite.

The finished proofs, when dry, plain or albumenized, should be placed between some white paper, and a warm iron passed over it a few times ; this will be found to improve the appearance of the pictures considerably.

In concluding the paper process, I must again advise those who are desirous of preserving their finished productions, for their own or friends' admiration, not to be sparing of water, and where it is at all practicable, to finish the washing by allowing a constant dribbling of water to run from a tap for at least six hours ; for paper, when not carefully washed, especially albumenized prints, soon acquire a yellow tint, which does not by any means improve their appearance. In mounting photographs, I would not recom-

mend paste, particularly if not quite fresh, for if they get at all damp, they will soon discolour. Thick gum-water, or gelatine dissolved in hot water, is much better. Some dissolve india-rubber in mineral naphtha, and use this as a cement, the advantage of which is that it dries quickly, and does not cause the cardboard to curl or cockle up.

STEREOSCOPIC PHOTOGRAPHY.

To Sir David Brewster we are principally indebted for the stereoscope; the use and almost magical results of which are now so well known and understood that it is hardly necessary for me to describe, in this little work, the causes of its beautiful results. To those who are desirous of studying binocular vision I would recommend a perusal of Mr. Hardwich, or Professor Hunt's works, both of whom have entered greatly into its theory. There are two kinds of stereoscopes, the reflecting stereoscope of Professor Wheatstone, and the lenticular one of Sir David Brewster. The former is for the purpose of viewing pictures of almost any size, whilst the latter is confined to the small ones only. The reflecting stereoscope, Fig. 20, consists of two plain mirrors, which are

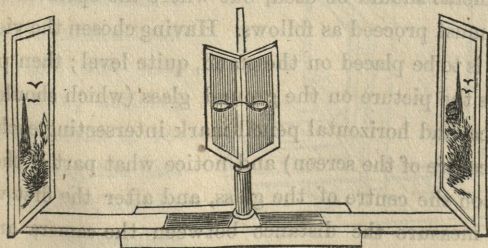


Fig. 20.

fixed on a centre pillar or other support, and are capable of adjustment. The pillar is fixed in a mahogany board or frame, with grooves on either side, in which two arms slide for holding the pictures; these arms having several adjustments, we are enabled, by raising, lowering, and turning to get them both to exactly coincide when viewed in the mirrors.

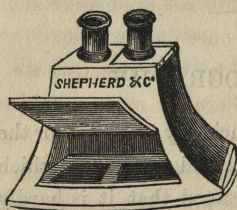


Fig. 21.

The lenticular or refracting stereoscope of Sir David Brewster, Fig. 21, consists of a wooden frame, on the top of which are two brass tubes, which are made to adjust to suit the differences of sight; in these tubes are fixed two semi-lenses, which are formed by cutting a circular lens in two, and mounting the halves so that their edges come together, and corresponding with the pupil of the eyes—the average distance of which is $2\frac{1}{2}$ inches—the form of these instruments is now considerably improved, the above form being seldom or ever made now.

METHOD OF TAKING STEREOSCOPIC PICTURES.

For taking large pictures for the reflecting stereoscope, two cameras should be used, but where the operator has but one, he must proceed as follows. Having chosen the view, the camera is to be placed on the stand, quite level; then proceed to focus the picture on the ground glass (which should have a vertical and horizontal pencil mark intersecting each other in the centre of the screen) and notice what part of the view falls upon the centre of the glass, and after the first view is taken, measure the distance between the camera and the nearest object that comes in the view, if it is a hundred feet,

the camera and stand must be moved in a straight line, a distance of four feet, when the view is to be again focussed, and the part that intersected the lines in the first view must be the same in this; the picture may be then taken. When the resulting pictures are printed and fixed in the reflecting stereoscope, the effect will be truly pleasing, the buildings and foliage will appear to stand out with all the realities of nature, and if they are both coloured alike and judiciously, we can fancy ourselves at once on the spot.

In taking portraits or small views, for the refracting stereoscope, the cameras Figs. 22 and 23 are the most suitable.

Fig. 22 represents a form of stereoscopic camera on the Latimer Clarke principle; it consists of a board, with parallel lathes on which the camera is mounted and fastened at one end; the two front ends of the bars are attached to a double threaded screw, the use of which is for increasing the angle for taking the views. When a stereoscopic picture is to be taken, the camera must be placed on the right hand side, and the view carefully focussed, noticing what part bisects the vertical line; then shift the camera over to the left side, and see whether the same objects still bisects the vertical line, if not, turn the milled head of the right and left-handed screw, noticing how many turns it requires to bring the part on to the line; for instance, if it requires four turns, then push

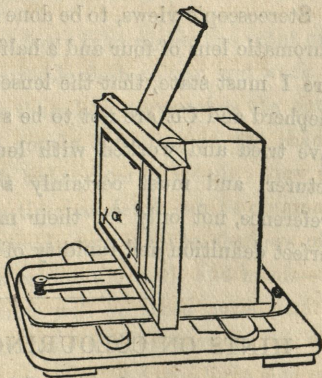


Fig 22.

the camera again on to the right hand side, and turn the screw *back* again four turns ; then proceed to take the first view. After giving the proper amount of exposure replace the cap of the lens, and push the camera over to the left side, and turn the screw *forwards* four turns, and proceed to expose the second half of the plate.

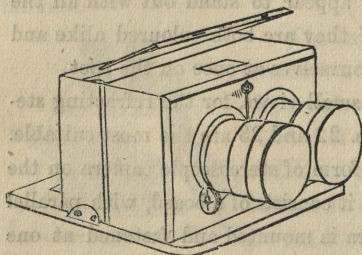


Fig. 23.

Fig. 23, represents a twin lens camera, by which the two pictures are taken at the same time, and is particularly adapted for portraiture, or in taking animals or objects that are likely to move. In mounting proofs

taken from negatives by this camera, it must be borne in mind that the pictures must be reversed—that is, the right hand picture must be placed on the left, and the left one on the right.

Stereoscopic views, to be done effectually, require a single achromatic lens of four and a half or five inches in focus, and here I must state, that the lenses manufactured by Messrs. Shepherd and Co. are not to be surpassed by any maker. I have tried and worked with lenses of nearly every manufacturer, and must certainly say, that I give them the preference, not only for their moderate cost, but for their perfect definition and rapidity of action.

HINTS ON COLOURING PHOTOGRAPHS.

The process of colouring glass positives is by no means a very difficult matter, although very imperfectly practised by

Photographic artists in general. A knowledge of drawing is not absolutely necessary, as the outlines, together with the lights and shadows, are furnished to the colourist. The colours, when skilfully prepared (a very difficult task), adhere to the surface of the collodion film, and with a peculiar varnish prepared for the purpose only of varnishing whitened pictures, (commonly termed alabastrine), give results undoubtedly equal to the finest finished ivory miniatures.

Select about a dozen or fifteen bottles of colours, labelled respectively for their different uses, or what is better, procure a colour box containing a complete set of colours, brushes, gold and silver shell, &c., as sold by Shepherd & Co. Their colours I have found by experience to have a decided superiority over others manufactured for the purpose; both as regards price and the excellence of their working qualities. The brushes should be of the finest quality (dark sable being the best), carefully preserving them from dust, &c., and after using, keep them well pointed by rinsing in a glass of water and passing between the lips.

To commence with the face: take up on the point of the pencil a small portion of suitable flesh colour, and work it on in a circular direction; as the colour approaches the outline, soften off with grey, and gently softening in the shadows, carefully keeping the high lights clear of colour; very little colour should be used at a time, as depth can be obtained by repeated applications. Avoid covering the shadows of the mouth, nostrils, &c., then colour the neck and hands—next put in the high lights, which will be those parts that were most exposed to the direct rays of light, such as the top of the brow, cheek-bones, nose, chin, and the light side of the face; soften this into the local tint of the flesh, then heighten

up the colour on the chest with a little 'carmine' or 'complexion' suitable to the subject. The lower lip is to be touched with the colour so named and prepared for that especial purpose, touching the light of the upper lip with a little 'crimson', carefully avoiding the shadows around the mouth. The eye to be touched with a suitable colour with a very fine sable pencil. The hair can be touched on the lights and half tones with a suitable colour, avoiding the shadows. Finish the hands with a little white on the knuckles, a little carmine on the nails, and a little flesh shadow or blue on the veins.

Draperies should be commenced with the high lights softening into the shadows. If the dress be silk, or any kind of a glossy fabric, the high lights should be kept faint; a very pleasing effect can be produced by colouring the dress, so as to represent shot silk, by using two colors, such as blue and orange.

Backgrounds of small pictures look best plain, keeping them light about the head; the various shades of grey, brown, green, &c. which are sold for the purpose, answer best worked in with a large pencil. A very pleasing effect can be produced by introducing a sky and distance, but that will require some skill and a knowledge of drawing. Having finished the colouring carefully, blow off with the india rubber bellows the loose colour, and remove any colours that may have adhered to the shadows.

Jewellery is mostly touched with gold and silver from shells sold for that purpose, but the most artistic effect is produced by oil or water colours. In colouring gold for the local colour, use yellow ochre, burnt sienna for the shadows, and pale chrome for the lights. For silver use white for the high lights, and grey for the shadows.

Stones in jewellery, and also flowers, are best painted in water colours.

THE DRY COLLODION PROCESS.

So greatly has the advantage of a dry process been estimated, that it is now becoming almost universally adopted, and is likely to become a formidable rival to the ordinary wet collodion, not only on account of the small quantity of apparatus required in the field, as compared with the wet, but the resulting pictures are frequently of a superior description, from the fact of being able to develop the picture at leisure, and in one's own operating room, where everything necessary is at hand, and ample space to manipulate in. For interiors of buildings the process is invaluable, when, from the little light that is generally to be obtained, a very lengthened exposure is absolutely necessary—an exposure varying from half-an-hour to two hours, whence, in which time, the wet plate would have become dried and perfectly useless. For the successful practice of the dry process, it is essential that the amateur or other should have a good knowledge of the wet, otherwise good results cannot be obtained. The manipulation is, in almost every respect, similar to the wet. The collodion should be of a thicker nature than ordinary, otherwise the negative will have frequently dots or minute pin-holes in it. Methylated collodions should be avoided, as they are not so sensitive as those prepared from pure ether. Pyrogallic acid for developing I prefer to gallic, from its quicker action, and recommend a stronger silver bath than for the wet process.

For the amateur I would recommend his first essay upon the Fothergill process, but for the proficient, the following modification of Taupenot's process (and worked with such great success by Mr. Moxham, of Bruges) is by far the best ; and giving results of such an exquisite description, independent of its longer keeping properties, as much depends upon the nature of the collodion used, I have given its formula in full.

FORMULA FOR THE COLLODIO-ALBUMEN; OR TAUPENOT PROCESS.

1. COLLODION.

Pyroxyline from hot acids	- - -	8 grains.
Ether 730°	- - -	4½ drachms.
Absolute Alcohol	- - -	3½ drachms.
Iodide Ammonium	- - -	4 grains.
Liquor of Ammonia	- - -	4 drops.

2. NITRATE BATH FOR COLLODION.

Nitrate of Silver (crystallized)	- - -	30 grains.
Distilled Water	- - -	1 ounce.
Saturate with iodide of potassium		

3. ALBUMEN MIXTURE.

White of Egg	- - -	6 ounces.
Honey	- - -	2 ounces.
Water	- - -	8 ounces.
Iodide of Ammonium	- - -	1 drachm.
Bromide of Ammonium	- - -	20 grains.

Place the white of egg and honey in a jar, and add a

table-spoonful of yeast, and place in a warm place; fermentation commences almost immediately, and will proceed for 5 or 6 days; when the fermentation has ceased, add the iodide and bromide dissolved in the water, mix well, and allow to stand for some days, till clear; then decant the clear portion, and filter for use.

4. NITRATE BATH FOR ALBUMENIZED PLATES.

Nitrate of Silver (neutral fused)	-	35 grains
Distilled Water	- - -	1 ounce
Glacial Acetic acid	- -	35 drops.

N.B.—Saturate first with iodide, and then with bromide of ammonium.

5. DEVELOPING SOLUTION.

Saturated solution of gallic acid in water, (or $1\frac{1}{2}$ grain of Pyrogallie) with 10 drops per ounce of glacial acetic acid, and 10 drops per ounce of a solution of pure nitrate of silver (40 grs.) added at the moment of using.

6. FIXING SOLUTION.

Saturated solution of hyposulphite of soda.

The formula for collodion given above must be considered as approximative only, and for this reason, that it is nearly impossible to obtain, even from the same maker, a pyroxyline twice following of the same quality. I will endeavour to explain the kind of film I get, for the great secret of success in this process lies in this point.

1st. The film must be perfectly structureless, and must set, free from all crapey lines, and present an even, glossy surface when dry.

2nd. It must be perfectly porous.

The film generally produced by using pyroxyline from hot acids, and with a large proportion of anhydrous alcohol approaches nearest to this of anything, but does not fulfil the required conditions; it gives a film which Hardwich calls "short," that is, on the application of the finger, it detaches in flakes, with edges of ragged fracture, but this is not enough. The addition of liquor ammonia (a few drops more or less) will generally produce the required degree of porosity, but if the pyroxyline is bad, it will be next to impossible to get a collodion which will set even. When the film is in that condition that you can write your name with your little finger on the glass (after sensitizing), and that the *edges* of the marks left are perfectly smooth, without any visible tearing, and when the collodion film removed by the finger is pushed before it in a mass of powdery paste, and when, at the same time, it is sufficiently firm on the glass to bear a stream of water from the spout of the pump, when held 18 inches below it, without breaking into holes, then you have a collodion which is invaluable for this process, and with which you cannot well go wrong. Collodion iodised with iodide of ammonium, and made from hot acid, pyroxyline, and anhydrous spirits will, in time, acquire these qualities, but if wanted immediately, the addition of liquid ammonia is the safest plan. Hot acid pyroxyline, dissolved in weak ether and alcohol, also gives a porous film, but the water accumulates in time by the evaporation of the ether, and you get a peculiar structure in the collodion, which renders it useless. Why I lay so much stress on the peculiar properties of the collodion is: Firstly, if you employ a half porous, or "short" collodion, the albumen partially penetrates its structure, but does not permeate it. Now, under the nitrate bath, the albumen has always a great

tendency to expansion, and it draws up the collodion with it from the surface of the glass. There are few collodions so tenacious as to withstand this action, and when they are so they are generally so little porous that there is a danger that the albumen has not properly penetrated the film, and if that is the case, it will blister, not in combination with the collodion, but separating from it. On the other hand, if the collodion possesses a proper degree of porosity, the albumen goes completely through the collodion, and, whilst it saturates the film, attaches itself to the glass below. In this state it would be difficult to get blisters, except in the case of greasy glasses. To favour this complete absorption of the albumen by the collodion film, it is important to use the bath as I have recommended further on, and to which end I find the usually adopted plan of pouring on the albumen useless. Again, the albumen being chiefly absorbed into the collodion film, it is evident that crapy lines from a bad collodion will be objectionable as shewing in the development. I ought to add that I only recommend the use of two baths when liquor ammonia is added to the collodion. The sensibility of the collodion is of no consequence whatever, nor is there any need of using a good bath for the first sensitizing; any old waste bath that has got out of order will answer perfectly well for this purpose, all impurities being washed out of the film before applying the albumen.

The manipulation is very simple, and is as follows:—having cleaned your glasses carefully, you arrange on your table your nitrate bath and four glasses. Fill the three first dishes half full with distilled water (filtered), and the fourth with albumen.

Dust the plate carefully with a soft brush before immersion, and when you have commenced work, leave your collodion bottle always open till you have finished; if the

stopper is placed after each plate, you are liable to get spots on the film.

Coat and sensitize the first plate, and on retiring it from the nitrate bath, immerse it in the first dish ; then coat and sensitize a second. Whilst the second plate is in the bath, you well wash the first by lifting it up and down at one end by means of a silver hook, which you slip under the glass, and lay for two minutes, then place it in the second dish, and follow on the same treatment for a third and fourth plate. Whilst the fourth plate is sensitizing you take the first prepared out of the third dish, and draining it slightly for half-a-minute on blotting paper, plunge it in the dish of albumen, and then sensitize another plate as before, always working in succession. The plate which has been placed in the albumen receives exactly the same treatment with the hook as those in the water ; it is well worked about in the liquid, and then withdrawn ; it is now covered with bubbles and froth, but you disregard this, and holding it over a funnel placed in the mouth of a clean bottle, you wash the bubbles off the face by means of an apparatus which I construct as follows :— (Fig. 24.)

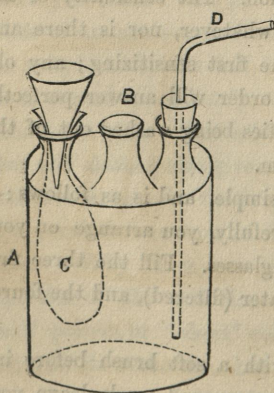


Fig. 24.

A is a wolfs bottle with three necks, *C* is a muslin bag passed through one of the necks, and into which is inserted the funnel *B*. A glass tube *D* inserted through a cork in the other neck reaches to the bottom of the bottle, and serves as a spout. The albumen is poured into this bottle through the funnel and bag ; the latter filters the liquid from the mucous threads which constantly form in it. The spout *D*

permits you to direct a stream of clear albumen against any pertinaceous bubble, and as it comes from the bottom of the bottle itself, brings no fresh bubbles from the interior, as they are only on the surface of the liquid. This bottle is re-filled, when exhausted, by the liquid you have collected in the bottle from the washings, and is filtered again for use by the bag as it passes in.

After the plates are albumenized as above, you place them in one corner to dry on blotting-paper. All the above may be done in daylight. Mr. Crookes has suggested (or Mr. Ackland) that the third dish should contain a small trace of iodide of potassium, in order that the nitrate of silver may be completely removed before the albumen is put on the plate. I am induced to think it is well for persons who commence this process to adopt that plan, as they generally err from not sufficiently washing the plates.

The albumenized glasses must be kept in a *dry* place, or they are apt to mildew (the honey attracting the moisture very strongly), until they are sensitized.

With regard to sensitizing, you go to work in the same way as with the collodion, only you wash in 4 waters, and change them frequently. The only things necessary to attend to here are, 1st, that your plates are quite dry before you put them in the bath ; for this purpose (if you have any doubt about it), you had better use a water bath made as follows. It resembles an ordinary

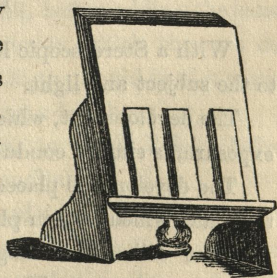


Fig. 25.

nitrate bath, only raised above the table by a couple of legs ; it is of block tin, and is soldered to some cross pieces

inside it, to prevent it from buckling by the heat or the weight of the water. It is filled with boiling water, and a spirit lamp is placed behind it, so as to keep the water at the boiling point; the plates are laid face upwards on the side of this, and are prevented from slipping down by a little ledge at the bottom. They dry as quickly as you can prepare them. A very frequent cause of stains is the following:—Working by rotation you have just taken a plate from the nitrate bath before you come to take the plate from the last dish to set it up to dry; if your fingers have retained some of the nitrate of silver about them, it will naturally drain on the wet plate, and it will most certainly produce a stain in developing.

The sensitizing is of course done in chemical darkness, and as soon as dry, the plates should be put in dark boxes, where (if the boxes are carefully made to exclude light and air, and are not of fir or deal) they will retain their sensibility for any time. My own experience goes as far as 13 months.

EXPOSURE.

With a Stereoscopic lens from 2 to 6 minutes, according to the subject and light.

The development, which may be effected a month after exposure, is simply conducted as follows:—

The developer is placed in a glass dish sufficient to cover the plate, which is then placed in it face upwards or downwards at will. The image generally begins to appear in about five minutes. The first appearance will enable you to judge if the exposure has been rightly timed. If, in the first five minutes, the sky begins to show itself distinctly with the outlines of the subject, and in the next five minutes you see

the high lights just coming out, you may be sure of a good negative. If, on the other hand, the lights and sky all come out quickly, and at the same time you have over exposed; and again, if the high lights do not show themselves soon after the sky, you may despair of having good half tones. In the last case if gallic acid is used it may sometimes be well to throw off the developer, and replace it with a weak pyrogallic developer in a clean dish, but such pictures are rarely satisfactory.

Lastly, fix as usual in *Hypo*, and abjure cyanide in this process; as in nine cases out of ten it will raise the film and spoil the negative.

The sources of failure in this process are, as far as my experience goes, chiefly as follows:—

1st. *Blistering of the combined film* by using an improper collodion, and an albumen without the admixture of honey, and sometimes from greasy glasses.

2nd. Blistering of the film from the use of iodide, containing carbonates. When this is the case, the acetic acid in the bath disengages carbonic acid, and blisters are the consequence. To avoid this, it is well, before adding the iodide and bromide, to drop into the water in which they are dissolved a little tincture of iodine till the liquid is of a canary yellow colour, and allow it to stand a half hour.

3rd. Stains from the fingers, to which I have before alluded, are avoided by careful handling.

4th. General clouding of the plate in the development. This may arise from three causes, which indicate their respective remedies, first, from imperfect washing after the last sensitizing, second, from the plates not being sufficiently protected from light either in the box or during drying, and third, from oxidising vapours, such as ammonia in the operating room.

These are the only annoyances I have been subjected to ; when proper precautions are taken to avoid them, the process is certainty itself.

THE FOTHERGILL PROCESS.

Mr. Keene, who has done so much for the success of this process, recommends the following method of manipulation.

BATH SOLUTION.

In a 20-ounce glass measure put 700 grains of pure prepared nitrate of silver and 3 ounces of distilled water, to these, when dissolved, add 6 grains of iodide of potassium previously dissolved in one drachm of distilled water, stir with a glass rod until the yellow precipitate is dissolved, then pour in sufficient distilled water to make the whole measure 20 ounces ; in about 12 hours filter, if necessary, passing it a second or third time through the filter till quite clear ; lastly, add one or two drops of glacial acetic acid, the larger quantity necessary if silver contains any oxide. This bath is slightly acid to test paper, and suitable for all negative purposes. Its strength should be kept up by the occasional addition of prepared nitrate of silver, allowing nearly two grains for each stereoscopic size plate sensitized, larger sizes a quantity in proportion.

PREPARED ALBUMEN.

Take White of Eggs . . .	10 ounces
Distilled Water . . .	10 to 15 ounces
Strong Liquor of Ammonia . . .	80 to 100 minims.

Agitate in a bottle that will hold double the quantity

until well frothed. The quantity of water necessary depends upon the consistence of whites of eggs, generally speaking the larger quantity is required in summer. The Prepared Albumen should be of a consistence to filter readily through filtering paper and flow easily over the plate. It will be found to work better when a week or ten days old, and sufficient for a month's consumption or more may be prepared at once if the bottle is kept well corked to prevent evaporation of ammonia.

PREPARING PLATES.

Coating and Sensitizing.—Having carefully removed dust with a clean leather or brush kept for that purpose, coat with collodion, and when well set, immerse in nitrate bath; in about a minute move it up and down, and in two or three minutes (according to temperature) remove, wipe the back with blotting paper, and place pneumatic holder, and proceed as follows:—[NOTE.—As success chiefly depends upon this part of operation about to be described, much attention should be paid to it.]

No. 1.—Having placed the plate on the holder, have ready, for a stereoscopic-size plate, 4 drachms of distilled water, which at *once* pour lightly on at one corner, or along the end, and cause it to flow to the opposite end; or better still, by which risk of over-washing and loss of sensitiveness at one end is avoided. Hold the glass near the surface of plate, and commence to pour lightly on end nearest you, gradually advancing as the wave proceeds to the opposite one, then back again, *carrying it well up to edges of ends and sides*; continue this for about half-a-minute in summer, or a minute in winter—large plates about double the time—until

all greasiness disappears and the bath on surface is *evenly diluted in every part*, when sufficient motion may be given to send most of the water *over* the edges, or—which for a beginner is perhaps preferable—return it into the glass and pour it lightly on and off several times, letting it run over edges of ends and sides (if the plate is held in the hand for this purpose, care must be taken that fingers are free from the more concentrated nitrate bath), drain for a second or two and apply the Albumen ; for this purpose the plate may remain in the same position as for applying water, and sufficient (about $1\frac{1}{2}$ drachms for stereo-plate) of the Prepared Albumen, previously filtered, poured on to coat it, pass it round two or three times *well up to edges*, then add to it as much distilled water as plate will conveniently hold ; agitate freely that they may mix, *empty off over the edges of ends and sides*, wash the back of plate by pouring a little water over it, and well wash as follows :—place the plate in a dish containing sufficient distilled or filtered rain-water to cover it to the depth of a quarter of an inch or more, agitate freely, that the water may flow backwards and forwards over it ; continue this for half-a-minute or a minute, towards the last lifting up the plate that water may pass under it ; repeat with a second quantity of water ; if wanted for long keeping, take it out, flush the surface with a small quantity of distilled water, and place at an angle sensitized surface inwards on two or three thicknesses of blotting paper, in a perfectly dark place, upon and leaning against *glass or porcelain* to dry. After about ten or fifteen minutes change the blotting paper for a single thickness of dry, the first lot should not be again used, but this last may several times for the same purpose. In about half-an-hour or an hour, according to state of atmosphere and dryness of room, the plate will be surface

dry and may be thoroughly or film dried—this should always be done in damp weather and winter time, particularly if required to be long kept—at a temperature not exceeding 120° Fahr., by any convenient method that may suggest itself, such as placing for a few minutes on a hot water plate, hot brick, or plate of metal, brought into operating room, &c.

EXPOSURE IN THE CAMERA.

The *mean* exposure may be considered, during spring and early summer, from forty-five to ninety seconds ; minimum from twenty-five seconds ; autumn and winter longer.

DEVELOPING.

The surface of the plate is to be moistened with distilled water, and the requisite quantity of developing solution (about three drachms for a stereo-plate), containing silver solution poured upon it, which is to be kept in motion, being changed as often as it becomes coloured, and the plate washed before application of a fresh quantity, until sufficiently developed. Over development, producing intense negatives, which require a great deal of printing, and giving objectionable black and white or snowy-looking positives, should be avoided. Many otherwise excellent negatives are spoiled in this manner. No advantage is obtained by continuing the development after details are well out, unless for some particular object, for though details in shadow may be more fully brought out, those in high lights are proportionately lost from excess of intensity.

The time occupied in developing varies from five minutes upwards.

Pyrogallic Acid	1½ grains
Glacial Acetic Acid	20 to 30 minims
Distilled Water	1 ounce.

Dissolve. Add to each drachm, just prior to use, two or three drops of a twenty grain solution of nitrate of silver.

When developed, wash off the solution, and fix with a solution of

Hyposulphite of Soda	4 ounces
Water	12 ounces.

This has to remain on the plate for a few minutes (from ten to fifteen,) to thoroughly remove yellow iodide. If used stronger, or solution of cyanide of potassium substituted (the latter also much weakens negative), the film will be liable to crack and curl off when drying."

I would recommend the amateur to make his first essay upon the dry process by using the Stereoscopic Camera, the best form of which is that shown as under.

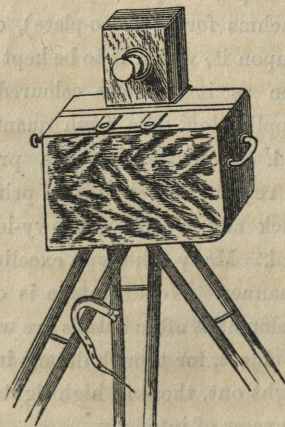


Fig. 26.

3
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		1	5	0
No. 2.	Ditto, $\frac{1}{4}$ plate, the lenses $1\frac{3}{4}$ in. diameter, $4\frac{1}{2}$ in. focus, producing pictures $4\frac{1}{4}$ by $3\frac{1}{4}$, and under	1	10	
	Ditto, adapted for Views	2	0	0
No. 3.	Ditto $\frac{1}{2}$ plate, the lenses $2\frac{1}{2}$ in. diameter, $7\frac{1}{2}$ in. focus, producing pictures $6\frac{1}{2}$ by $4\frac{3}{4}$, and under	3	10	0
	Ditto, adapted for Views	4	5	0
No. 4.	Ditto whole plate, the lenses $3\frac{1}{4}$ in. diameter, 10 in. focus, producing pictures $8\frac{1}{2}$ by $6\frac{1}{2}$, and under	7	0	0
No. 5.	Ditto, the lenses 4 in. diameter, 12 in. focus	15	0	0

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No. 6.	Achromatic Lens, mounted in sliding tubes, the lens $2\frac{1}{4}$ in. diameter, 9 in. focus producing Views 7 by 6	1	10	0
No. 7.	Ditto, without rack and pinion movement	1	5	0
No. 8.	Ditto, lens $2\frac{1}{2}$ -in. diameter, 12-in. focus, producing Views 9 by 7	2	5	0
No. 9.	Ditto, without rack and pinion movement	2	0	0
No. 10.	Ditto, the lens 3 in. diameter, 15 in. focus, producing Views 10 by 8	3	10	0
No. 11.	Ditto, without rack and pinion movement	3	3	0
No. 12.	Ditto, the lens $3\frac{1}{2}$ in. diameter, 18 in. focus, producing Views 12 by 10	4	10	0
No. 13.	Ditto, without rack and pinion movement	3	15	0
No. 14.	Ditto, the lens 4 in. diameter, 20 in. focus, producing Views 15 by 12	6	0	0
No. 15.	Ditto, without rack and pinion movement,	5	5	0
No. 16.	Ditto, the lens 5 in. diameter, 25 inch focus, mounted without rack and pinion movement, 18 X 15	9	0	0


SHEPHERD & Co.'s STEREOSCOPIC LENSES.

No. 17.	Achromatic Lens, mounted in sliding tubes, the lens $1\frac{1}{4}$ in. diameter, $4\frac{1}{2}$ in. focus	0	12	0
No. 18.	Ditto, with rack and pinion	0	16	0
No. 19.	Ditto, $1\frac{3}{4}$ in. diameter	1	1	0
No. 20.	Ditto, without rack and pinion	0	16	0
	Pair of No. 19, for views, $1\frac{3}{4}$	2	5	0
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1 $\frac{1}{2}$ -in. Diameter, for Views 9 by 7, £2 2s.

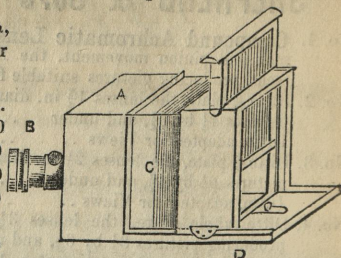
The above Lenses are all Shepherd & Co.'s own make; other Lenses, English or Foreign, supplied to Order.

 Waterhouse's Diaphragms applied to any of the above Lenses.

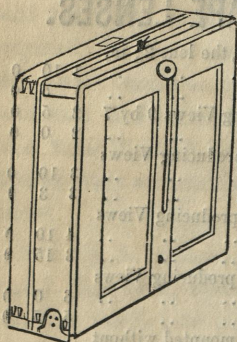
SHEPHERD & Co's CAMERAS—SQUARE SHAPE.

Superior Mahogany sliding-body Camera, with one single back and three inner frames and focus screen :—

No. 22.	£ s. d.
For plates $4\frac{1}{4} \times 3\frac{1}{4}$, & under 1	1 10 0
No. 23. Do., $6\frac{1}{2} \times 4\frac{3}{4}$, „	1 14 0
No. 24. Do., $8\frac{1}{2} \times 6\frac{1}{2}$, „	2 10 0
No. 25. Do., 10×8 , „	3 10 0
No. 26. Do., 12×10 , „	4 10 0
No. 27. Do., 14×12 , „	5 10 0
No. 28. Do., 16×14 , „	6 10 0



No. 22.



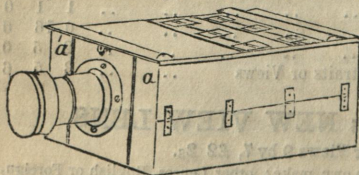
No. 29.

Extra Grooves to any of the above, 5s. each. Shifting fronts to any of the above Cameras, from 5s. to 15s.

SWING AND ANGULAR BACK CAMERAS in STOCK AND MADE TO ORDER.

SHEPHERD & Co's FOLDING CAMERAS.

Superior folding mahogany Cameras, with vertical and horizontal sliding fronts, 1 double back for paper, 1 single ditto, and 2 inner frames for collodion.



No. 34.

Double Backs for Paper can be adapted to all the above Cameras.

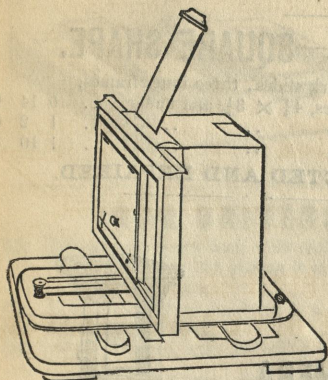
SHEPHERD & CO'S PORTABLE BELLOWS CAMERAS, WITH SHUTTER, BOTTOMS, &c.

These Cameras, from their carefully contrived arrangements, ensure great firmness and rigidity, and are highly recommended. They possess an almost unlimited amount of adjustment in focussing, and can be used with Lenses of every description. The engraving represents this Camera closed.

No.	For plates	£ s. d.
No. 29.	For plates 7×6 , and under	2 12 6
No. 30. Ditto,	9×7 , „	4 0 0
No. 31. Ditto,	10×8 , „	5 5 0
No. 32. Ditto,	11×9 , „	6 15 0
No. 33. Ditto,	12×10 , „	8 0 0

Larger sizes to order.

STEREOSCOPIC CAMERAS.



No 38.

No. 38.

Latimer Clarke's

STEREOSCOPIC CAMERAS,

arranged on parallel laths £2 5 0

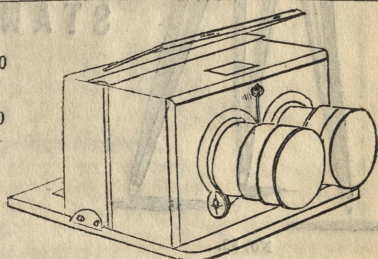
No. 39.

Ditto, with extra Back for

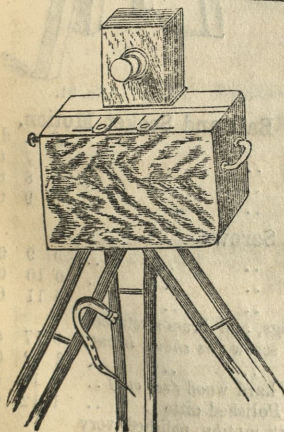
Collodion pictures .. £2 15 0

40. Twin Stereoscopic Cameras
for two Lenses, and taking
two pictures at one time £2 2 0

41. Ditto, with double-front
rack motion £2 10 0



No. 40.



No. 42.

No. 42. **NEW BOX**
STEREOSCOPIC CAMERA,

For the Dry Collodion process,

with six backs, focussing eye tube, spirit
level, view meter, and a superior view lens
with rack and pinion, tripod stand, &c.,
complete... £6 10 0

*Extra Backs and Carriers supplied to any
of the above.*

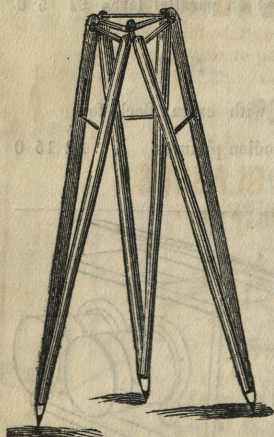
N.B.—Silver Wire Corners are put to all Plate-
holders in the above Cameras.

S. & Co.'s NEW DARK BOX, for holding and changing prepared Dry Plates in the Field. Extra Dark Slide and Field Box for 12 plates, Stereoscopic Size, £3.
Other sizes to order.

WALNUT CAMERAS—SQUARE SHAPE.

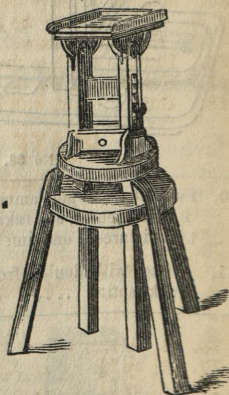
43. Sliding body Camera, with two dark slides, three inner frames, and focus screen for collodion plates, $4\frac{1}{4} \times 3\frac{1}{4}$, and under .. 0 14 0
44. Ditto, $6\frac{1}{2} \times 4\frac{3}{4}$ 1 2 0
45. Ditto, $8\frac{1}{2} \times 6\frac{1}{2}$ 1 10 0

CAMERAS, &c., CORRECTED AND REPAIRED.



No. 52.

CAMERA STANDS.



No. 54.

Tripod Stand with Wooden Screw, Ball and Socket Motion.

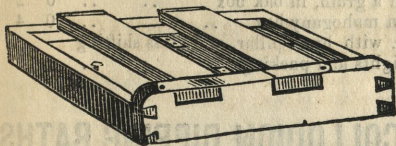
						£	s.	d.
46.	1/4 size	..	..	..	..	0	7	6
47.	1/2 ditto	..	..	..	..	0	8	6
48.	Whole ditto	..	..	..	..	0	9	6

Ditto with Brass Screws.

49.	1/4 size	..	..	..	..	0	9	0
50.	1/2 ditto	..	..	..	..	0	10	0
51.	Whole ditto	..	..	..	..	0	11	6
52.	Best made Stands, with double tripod legs, and brass stretchers, triangle $\frac{1}{2}$ -plate metal top, and fixing screw (<i>as shown in cut</i>)					0	17	6	
53.	Ditto,	ditto, 1/1	..	..	..	1	2	0
54.	Table Stands, with extra adjustments, in hard wood (<i>see cut</i>)					0	18	0	
55.	Ditto, Oak	.. 25s.	56.	Polished ditto	..	1	12	0	
57.	Ditto, with self-adjusting metal rack-work motion, polished, very superior description					from	3	10	0

PRESSURE FRAMES.

Superior constructed, with jointed backs, in order that the progress of Printing may be examined without displacing the paper.



No. 58.

	s.	d.
58. 1/4 plate ..	4	0
59. 1/2 plate ..	6	0
60. 1/1 plate ..	7	6
61. 10 × 8 plate ..	10	0
62. 12 × 10 plate ..	12	0
63. 15 × 12 plate ..	15	0
64. Stereoscopic ditto	4	0

IRON UNIVERSAL HEAD REST,

65. Mounted on heavy foot, with sliding adjusting tube for steadying the head, when the person is either standing or sitting, without the aid of a chair	1	1	0
66. Ditto, to attach to the back of a chair	0	3	6
67. Head Rest of Wood	0	1	4
68. Ditto ditto, with adjusting joints	0	3	6

PLATE BOXES, FOR GLASSES,

Twelve Grooves, (White Wood.)

	s.	d.		s.	d.
69. 2½ by 2	0	10	72. 5 by 4	1	6
70. 3¼ by 2¾	1	0	73. 6½ by 4¾	1	9
71. 4¼ by 3¼	1	3	74. 8½ by 6½	2	6
75. Stereoscopic	1s.	6d.			

Twenty-four Grooves.

76. 2½ by 2	1	3	79. 5 by 4	2	0
77. 3¼ by 2¾	1	6	80. 6½ by 4¾	2	6
78. 4¼ by 3¼	1	9	81. 8½ by 6½	3	6
82. Stereoscopic	2s.	6d.			

Fifty Grooves.

83. 2½ by 2	1	6	86. 5 by 4	2	6
84. 3¼ by 2¾	1	9	87. 6½ by 4¾	3	0
85. 4¼ by 3¼	2	0	88. 8½ by 6½	4	0
89. Stereoscopic	3s.	6d.			

PLATE BOXES FOR GLASS,—POLISHED MAHOGANY.

Twelve Grooves.

	s.	d.		s.	d.
90. For plates 2½ by 2 in. ..	2	6	93. For plates 5 by 4 in ..	4	0
91. " 3¼ " 2¾ " ..	3	0	94. " 6½ " 4¾ " ..	5	0
92. " 4¼ " 3¼ " ..	3	6	95. " 8½ " 6½ " ..	6	0
96. Stereoscopic	5s.	0d.			

Metal Boxes for Sensitive Plates or Paper.

GLASS SPIRIT LAMPS,

2s. 6d. — 3s. 6d. — 4s. 6d.

PHOTOGRAPHIC LANTERNS

For preparing and developing sensitive paper or plates, from 1s 6d., 3s. 6d., 6s.

LEVELLING STANDS;

Triangle shape, of brass, with adjusting screws, for supporting Plates in developing, from 3s. to 7s. 6d.

PNEUMATIC PLATE HOLDERS,

147. Plain, 1s. 6d. | 148. With Lever, .. 2s. 6d. | 149. Large, 3s. 6d.

PHOTOGRAPHIC GLASS.

Best Patent Plate.

2½ by 2	per dozen	0 7	6½ by 4½	per dozen	4 0
3¼ by 2¼	"	1 2	7 by 6	"	5 0
4¼ by 3¼	"	1 9	8½ by 6½	"	7 6
5 by 4	"	2 6	9 by 7	"	9 0
6 by 5	"	3 8	Stereoscopic	"	3 0

Crown Glass.

	PER GROSS	PER DOZEN	BEST, PER DOZ.
2½ by 2	1 0	0 1½	0 2
3¼ by 2¼	1 9	0 2½	0 4
4¼ by 3¼	3 6	0 4	0 6
5 by 4		0 5	0 9
6½ by 4½		1 4	1 6
8½ by 6½		2 6	3 0
Stereoscopic		1 0	1 4

PURPLE, OR BLACK GLASS.

1½ per dozen	0 4	1/3 per dozen ..	1 0
1/6 "	0 8	1/2 "	3 9
1/4 "	1 2	1/1 "	5 0

OPAL GLASS TO ORDER.

150.

YELLOW GLASS, FOR DARK ROOMS, 1s. per square foot.

PASSE-PARTOUS.

151.		
BROWN, TORTOISESHELL,		
or White Ground; oval,		
cushion, or dome shape.		
1/9 per doz.	s. d.	1 3
1/6	"	1 9
1/4	"	2 4
1/3	"	4 3

152.		
SECOND QUALITY.		
1/9 per doz.	0 11	
1/6	" 1 6	
1/4	" 2 0	
1/3	" 3 9	

153.
WHITE PORCELAIN GROUND
gold or buff bevel, with extra
black line, oval, cushion
or dome shape.

1/9 per doz.	2 0
1/6	" 2 9
1/4	" 3 6
1/3	" 5 6
1/2	" 7 6

154.		
SECOND QUALITY.		
1/9	per doz.	1 7
1/6	"	2 0
1/4	"	2 8
1/3	"	4 2

155.		
GOLD GRAINED GROUND,		
oval, cushion, or dome		
shape.		
1/9	per doz.	4 6
1/6	"	6 0
1/4	"	7 6
1/3	"	10 0
1/2	"	15 0
1/1	"	28 0

156.
BROAD MARGINS, WHITE
rough or smooth ground,
and white bevel; oval,
cushion, or dome shape.
A very superior article,

1/9 per doz.	s. d.	3 0
1/6	"	4 0
1/4	"	5 6
1/3	"	7 0
1/2	"	9 6
1/1	"	14 0
Extra....	"	19 0

157.		
ORDINARY.		
1/9	per doz.	2 0
1/6	"	3 9
1/4	"	4 0
1/3	"	6 3
1/2	"	7 0
1/1	"	10 0
Extra....	"	16 6

158.

INFERIOR QUALITY.

1/9	per doz.	1 6
1/6	"	1 10
1/4 ..	..	" 3 0
1/3	"	4 9
1/2	"	5 6
1/1	"	9 0

159.
THE BRIGHTON BROAD
Margin Passe Partous, plain
white, rough or smooth
ground, very narrow bevel.
—a chaste mount, and the
best adapted for paper pic-
tures.

SUPERIOR QUALITY.		
1/9	per doz.	3 3
1/6	"	4 0
1/4	"	5 6
1/3	"	7 6
1/2	"	10 0
1/1	:	15 0
Extra....	"	20 0

160.			
SECOND QUALITY.			
1/9	.....	”	2 9
1/6	.....	”	3 9

1/4 per doz.	s. d.	5 0
1/3	"	6 9
1/2	"	8 6
1/1	"	13 0
Extra....	"	17 6

161.
THE NAPOLEON BROAD
Margin Passe Partous. A
new and elegant design,
rough white ground, nar-
row gilt bevel, and colored
margin 1-inch wide round
the opening.

161.		
THE NAPOLEON BROAD		
Margin Passe Partous. A		
new and elegant design,		
rough white ground, nar-		
row gilt bevel, and colored		
margin 1-inch wide round		
the opening.		
SUPERIOR QUALITY.		
1/4 per doz.	s. d.	8 0
1/3	"	12 0
1/2	"	17 0
1/1	"	21 0

162.
THE FARRINGTON BROAD
Margin London Passe Par-
tous, plain white ground,
very narrow gilt bevel, with
open back and rings for
suspending.

1/4 per doz.	6 0
1/3	" 8 6
1/2	" 13 0
1/1	" 16 6

163.	
SECOND QUALITY.	
1/4	per doz. 5 6
1/3	„ 7 9
1/2	„ 10 0
1/1	„ 13 6

164.
THE EUGENIE BROAD
Margin rough white ground
colored Serpentine Mount
1-inch round the opening.

1/3 per doz.	9 6
1/2	" 11 6
1/1	" 18 6
Extra....	" 26 0

165.	165a.
METAL BEVEL White ground Passe Partous.	Broad Margins
s. d.	s. d.
1/6.. per doz. 4 3	5 6
1/4.. „ 5 6	8 0
1/3.. „ 8 0	11 0
1/2.. „ 11 0	16 0
1/1.. „ 16 0	

167.

METAL OVAL PASSE PARTOUS, White
or Coloured ground, with ornamental
gilt Serpentine edge.

1/9.....	per doz.	14	6
1/6	„	17	6
1/4	„	21	0

166.	166½.
SQUARE PRESERVER PASSE PARTOUS, white and drab ground.	OVAL PRE- SERVER PASSE PARTOUS.
s. d.	s. d.
1/9.... per doz. 3 0	5 0
1/6.... „ 4 0	6 6
1/4.... „ 6 6	8 0
1/3.... „ 8 0	

168.

PASSE PARTOUS FOR MINIATURES,
white ground, narrow white or gold
bevel.

1/16 Openings.....	per doz.	3	6
1/12 „	„	4	0

Passe Partous for Stereoscopic Pictures,

oval, cushion, or dome shape,

3/0 per dozen; with gilt line, 3/6.

Card mounts for Stereoscopic pictures, 6d. per dozen, or 4/6 per gross.
Buff embossed card, 4/0.

FRAMES, FOR PASSE PARTOUS, &c.

169.

ORDINARY ROSEWOOD AND OAK SQUARE
FRAMES, highly Varnished, for Passe
Partous.

	s. d.
1/9 per doz.	3 0
1/6 „	3 6
1/4 „	4 0
1/3 „	5 0
1/2 „	7 0
1/1 „	10 0
Extra „	12 0

171.

RICHLY ORNAMENTED GOLD FRAMES,
oval or cushion shape, for Passe Partous

	s. d.
1/6 each	1 3
1/4 „	1 9
1/3 „	2 0
1/2 „	2 9
1/1 „	3 9

170.

THE HAVELOCK, a new and beautiful
imitation of Rosewood and Tulip and
Knotted Oak oval frames.

1/4 each	1 9
1/3 „	2 0
1/2 „	2 6
1/1 „	3 3
Extra „	4 0

172.

THE NEW AND ARTISTIC SERPENTINE
edge, Oval Gilt Frame.

SUPERIOR QUALITY.

1/4 each	3
1/3 „	4
1/2 „	4
1/1 „	6
Extra „	7

ROMAINEAN FRAMES, Fitted,

1/6 per dozen... 5s. 6d.

1/4 per dozen 8s. 6d.

MOROCCO CASES.

173.

Morocco Cases, fitted with Gilt Mats and Glasses, and Gilt Edges.

	s.	d.
For Portraits, 1/9.... per doz.	2	6
" 1/6....	"	4 0
" 1/4....	"	7 0
" 1/3....	"	13 0

174.

Morocco Cases, Silk Cushions, Gilt Edges, &c.—Fitted.

For Portraits, 1/9.... per doz.	4	6
" 1/6....	"	7 0
" 1/4....	"	11 0
" 1/3....	"	18 0

175.

Superior made Band Hook Morocco Cases, Silk Cushions, &c., finest quality, Gilt Edges.—Fitted.

For Portraits, 1/9.... per doz.	5	0
" 1/6....	"	7 6
" 1/4....	"	11 6
" 1/3....	"	20 0
" 1/2....	"	40 0

*Wedding and Cupid Cases in Stock.***TRAYS.**

179.

FITTED with Mats and Glasses.

	s.	d.
1/9 per doz.	1	0
1/6	"	1 6
1/4	"	2 6
1/3	"	4 6

176.

Band Clasp Cases, Silk Velvet Cushions, Gilt inside and out.—Fitted.

	s.	d.
For Portraits, 1/9.... per doz.	6	6
" 1/6....	"	8 6
" 1/4....	"	15 0

177.

Best Ribbed Band Clasp Cases, the most exquisite ever made.

For Portraits, 1/9.... per doz.	9	0
" 1/6....	"	12 0
" 1/4....	"	18 0
" 1/3....	"	24 0

These Cases are sold unfitted.

178.

Double Morocco Cases to receive two Portraits.—Fitted.

For Portraits, 1/9.... per doz.	6	6
" 1/6....	"	10 0
" 1/4....	"	15 0
" 1/3....	"	26 0

178a.

Elegant Bevil Clasp Cases.

For Portraits, 1/6.... per doz.	14	6
" 1/4....	"	22 0
" 1/3....	"	37 0

UNFITTED.

	Ordinary.	s.	d.	Best.	s.	d.
1/9 per gross	8	0	—	9	6	
1/6	"	10	0	—	12	0
1/4	"	15	0	—	18	0
1/3	"	24	0	—	28	0

MATS AND PRESERVERS.

180.

Preservers for binding Mats and Glasses.

1/9 per gross	3	0	1/3 per gross	18	0
1/6	"	4 0	1/2	"	40 0
1/4	"	6 6			

181.

181.
Gilt Mats, Chased or Plain; oval, cushion, or dome shape.

1/9	per gross	3	0	1/3	per gross	18	0
1/6	"	4	0	1/2 Best	"	40	0
1/4	"	6	6				

An Inferior Mat .. 1/9 .. per doz. 2s. 6d- | 1/6 .. per doz. 3s. 6d.

182.

German Mats, oval, cushion, or dome shape. The German Mat is an elegant improvement over the ordinary mat, and is particularly suitable for the best cases.

1/9 per doz. 3 0 | 1/6 per doz. 6 0 | 1/4 per doz. 7 6

A large assortment of New and Fancy Designs in Mats.

UNION SQUARE AND OCTAGON HORN CASES.

No. 183.

Square, Single, or Double.

1/16 Unfitted	per doz.	16	0
1/9 "	"	17	0
1/6 "	"	20	0
1/4 "	"	33	0

No. 183a.

OCTAGONS.

1/9 Fitted	per doz.	s.	d.
1/6 "	"	20	0
1/4 "	"	28	0
1/2 "	"	44	0

Family and Oval Union Cases in Stock.

UNION TRAYS.

A New and Beautiful Production.

No. 184.

1/9.....	per dozen	7 0	|	1/6	per dozen	9 0
1/4.....	per dozen	13 0				

Superior Photographic Brooches.

No. 185.....	s. d.	No. 191 Revolving Brooches,	s. d.
No. 186.....	2 0	for 2 Portraits....	8 6
No. 187.....	3 6	192. With Ivory devices, 8/6, 10	6 6
No. 188.....	4 6	Locketts, single, .. from 1/6 to 4	0 6
No. 189.....	5 6	Ditto, double from 2s. to 5	0 0
No. 190 Revolving Brooches,	8 6	Breast Pins,..... each, 1/6 & 2	0 0
for 2 Portraits....	5 0	Bracelets..... 7/6 to 20	0 0

SHEPHERD & CO.'S

CRYSTAL VARNISH, for POSITIVES.

gives a transparent and extremely hard coating, in 3-oz. bottles, 1s.

Shepherd & Co.'s NEGATIVE VARNISH.

dries without heat, is very durable, and warranted not to peel off, 4.oz. bottles, 2s.

Shepherd & Co.'s BLACK VARNISH,

For BACKING POSITIVES,

dries very rapidly, and does not crack, 6d. and 1s per bottle.

**SHEPHERD & Co.'s
IODIZED POSITIVE AND NEGATIVE COLLODIONS,**
6d. and 9d. per ounce.*These Collodions are very sensitive and constant in their action.***RAMSDEN'S POSITIVE COLLODION,**10s. per lb.; 5s. $\frac{1}{2}$ -lb.; 2s. 4-oz.; 1s. 2-oz., in sealed Bottles.**PONTING'S NEGATIVE COLLODION,**15s. per lb.; 7s. 6d. $\frac{1}{2}$ -lb.; 4s. $\frac{1}{4}$ -lb.**SHEPHERD & CO.'S****NEGATIVE COLLODION FOR THE DRY PROCESS,**10d. per oz.; 16s. 6d. per lb.; 8s. 6d. $\frac{1}{2}$ -lb.; 4s. 6d. $\frac{1}{4}$ -lb. bottles.The "Mirabilis" Developing Solution, for converting Positives
into Negatives, 1s. per Bottle.**SHEPHERD & Co.'s DETERGENT, or Plate Cleaning Solution,**
6d. and 1s. per Bottle.**SHEPHERD & Co.'s****SUPERIOR PREPARED COLOURS FOR COLLODION PICTURES,**

6d. per Bottle.

Flesh, Nos. 1, 2, and 3.

Carmine

Rose Carmine

Lip

Pink

Yellow, Nos. 1, 2, and 3.

Lavender

Claret

Scarlet

Horizon

Sky Blue, Nos. 1, 2, and 3.

Dark Blue

Grey. Brown, Nos. 1, 2, and 3.

Orange. White for Clouds

Plum

Violet

Green, Nos. 1, 2, and 3.

Shepherd & Co.'s Box containing 7 colours, with brushes, Gold
and Silver Shell

Ditto, containing 14 colours

Ditto " 21 " each

Gold Shells, 3d. each; Gold and Silver Cups

Camel's Hair Brushes, 1s. per dozen : do. in tin, 1s. 6d. and 2s.

Sable ditto, 4s. 6d. and 6s. 6d. per dozen.

£0 6 6

0 8 6

0 12 0

each 0 0 4

PURE PHOTOGRAPHIC CHEMICALS.

Alcohol, pure, per lb. 6s. per oz.	0 6	„ solution for toning bath, oz.	0 6
„ mythelated, „ 4s.	0 4	Iodine, pure	1 6
Acid, glacial acetic, 6s.	0 6	Iron, protosulphate per lb. 8d.	0 1
„ „ crystal	1 0	Kaoline	0 2
„ citric	0 6	Magnesia, nitrate ..	0 6
„ formic	0 6	Mercury, bichloride	0 4
„ nitric, pure „ 2s.	0 2	Naptha, for Spirit lamp, per pint	1 6
„ sulphuric, pure, 2s.	0 2	Oxymel	per oz. 0 4
„ gallic	1 6	Phosphate of Soda	0 6
„ pyrogallie, dram. 1/0	5 6	Potash, nitrate	0 2
Ammonia, pure....	0 2	Potassium, bromide	2 0
„ muriate	0 2	Potassium, cyanide..	0 3
Ammonium, bromide	3 0	„ fluoride..	2 0
„ iodide	3 0	„ iodide ..	1 6
Barium, chloride, per lb. 2s.	0 2	Rouge, finest	0 4
„ iodide	3 6	Silver, nitrate	4 0
Baryta, nitrate ...	0 3	„ fused	4 6
Benzole	0 3	Soda, hyposulphate lb., 8d.	0 1
Bromide of cadmium	3 6	Sodium, chloride ..	0 2
„ iodide..	3 6	„ fluoride	1 0
Calcium, bromide..	4 0	Sugar of milk	0 3
„ iodide ..	3 6	Test paper.... per book, 1½d.	
Carbonate of Soda	0 2	Tripoli	0 3
Charcoal, animal, pure	0 6	Varnish, positive, spirit	0 6
Cotton wool, per lb. 2/6	0 3	„ negative, chloroform	0 9
„ gun	3 0	Water, distilled per gallon	0 6
Dextrine	0 3	Developing for Positives, per pt.	1 0
Ether, sulphuric, rectified	0 6	Ditto for Negatives	1 6
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„ sel d'or, 15-grn. bottle	3 0	per pint.	

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Expanding Walnut Camera, with focus screen, two dark slides, and three inner frames	0	14	0
Tripod Stand	0	7	0
Bath and Dipper	0	2	6
Scales and Weights	0	2	6
Graduated Glass Measure	0	0	8
Porcelain Pan	0	1	0
Plate Box with 12 glass plates	0	1	4
Nitrate of Silver Solution in bottle	0	3	6
Protosulphate of Iron in bottle	0	0	6
Cyanide of Potassium	0	0	9
Glacial Acetic Acid	0	0	9
Nitric Acid..... ..	0	0	6
Collodion..... ..	0	1	6
Book of Instructions	0	1	0
	£3	7	6

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Tripod Stand	0	10	6
Gutta Percha Bath and Dipper	0	3	6
Scales and Weights in box	0	2	6
Plate Box with 12 glass plates	0	2	6
Two Glass Measures	0	1	6
Silver Bath	0	5	6
Collodion	0	1	6
Acetic Acid	0	1	6
Nitric Acid	0	0	6
Protosulphate of Iron	0	1	0
Cyanide of Potassium	0	1	0
Funnels.....	0	1	6
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Superior Expanding Mahogany Camera, dark slide and focus screen, with 3 inner frames.....	2	10	0
Superior Tripod Stand	1	0	0
Gutta Percha Bath and Dipper	0	5	6
Scales and Weights in box	0	2	6
Two Glass Measures.....	0	1	6
Plate Box with 12 glass plates	0	3	6
Silver Bath.....	0	6	0
Collodion.....	0	2	6
Acetic Acid.....	0	1	6
Nitric Acid.....	0	1	0
Protosulphate of Iron.....	0	1	6
Cyanide of Potassium.....	0	1	0
Two Funnels	0	1	6
Filtering Paper	0	1	6
Book of Instructions	0	1	0

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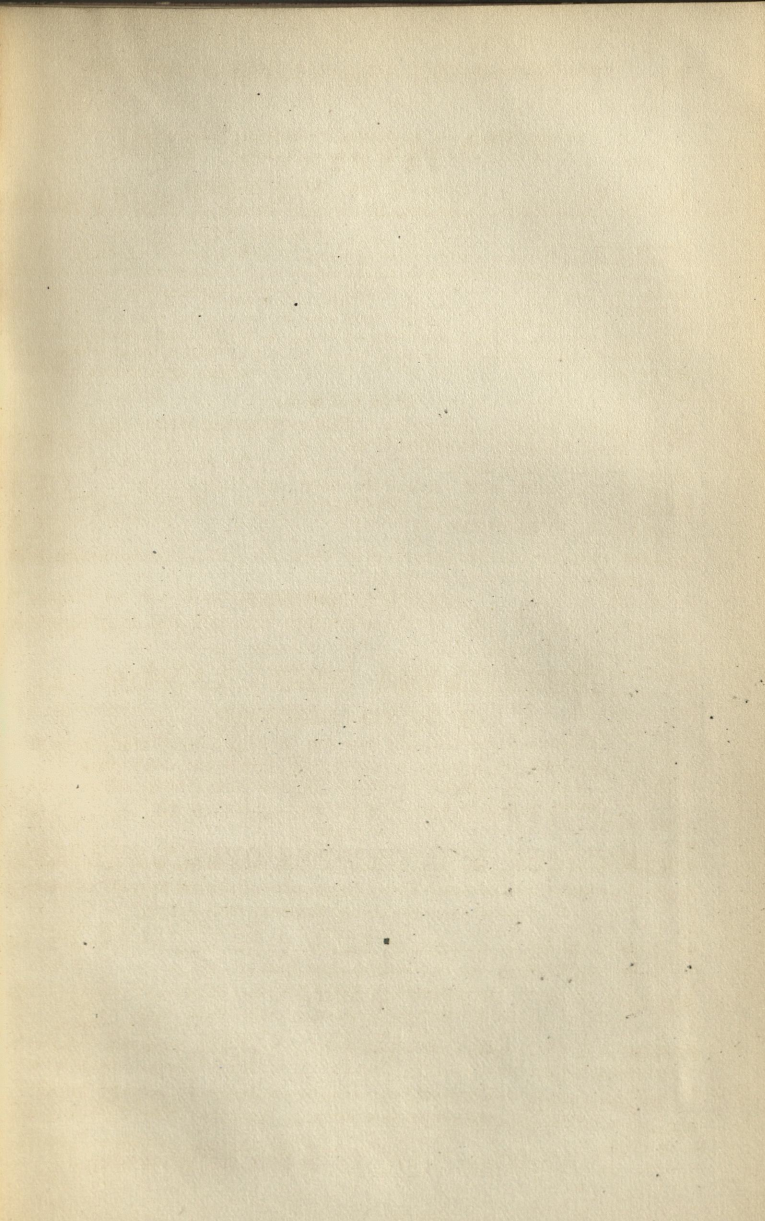
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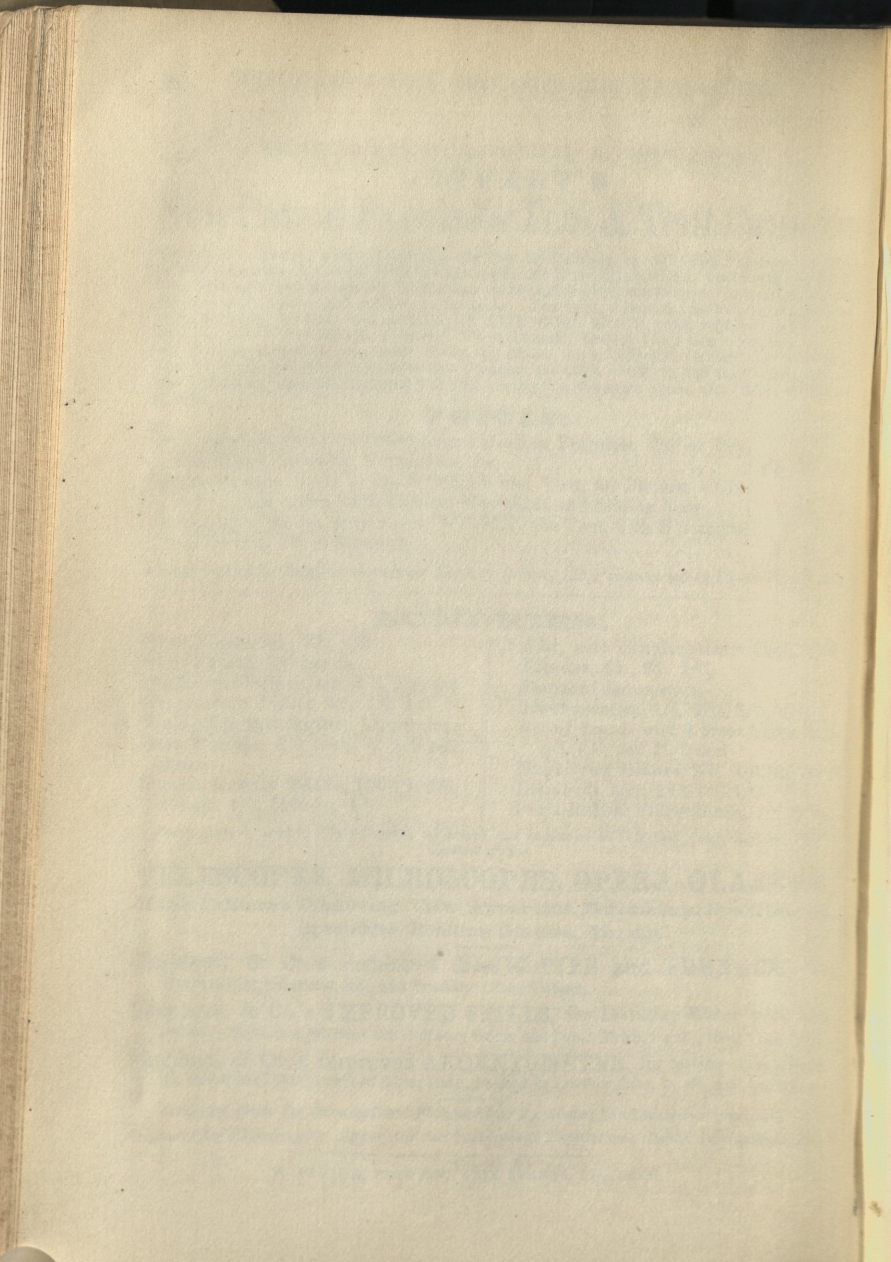
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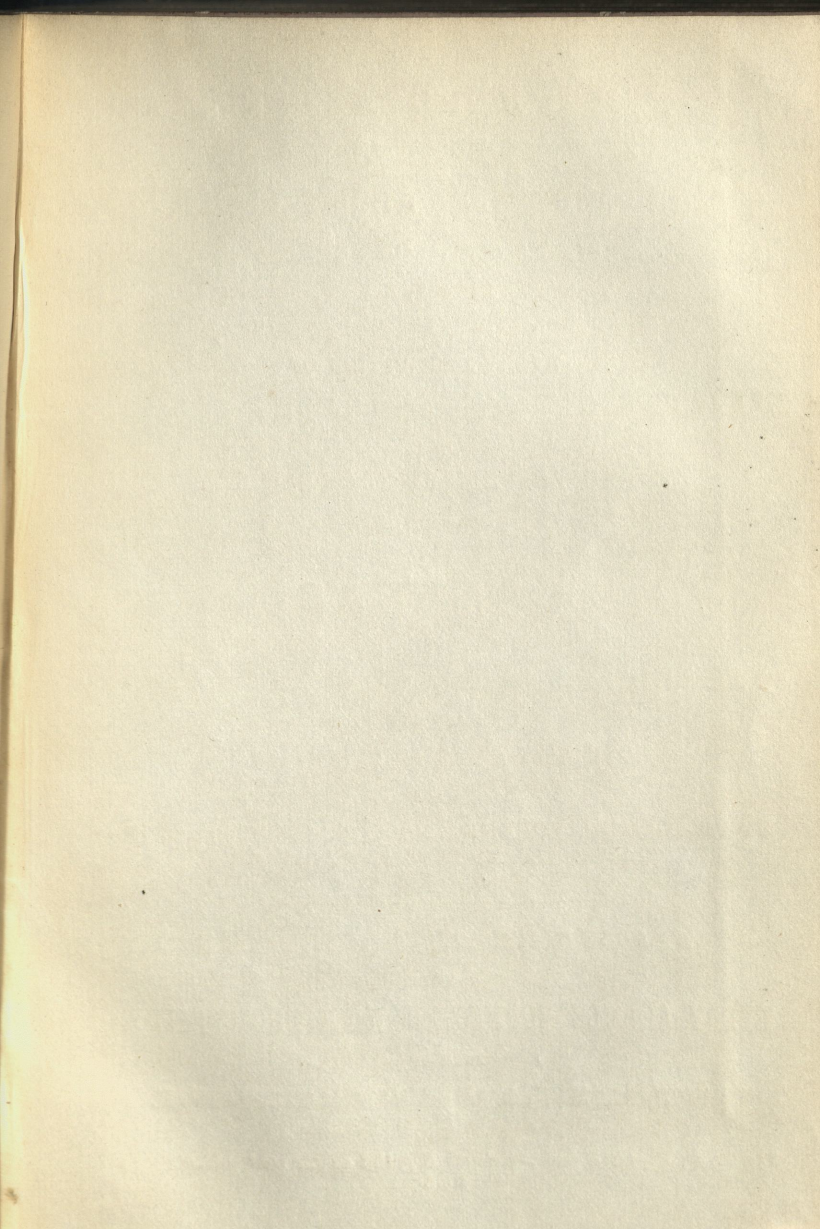
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